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VETERINARY MEDICAL ASSOCIATION MEETINGS

In the accompanying table the data given is reported by many Secretaries as being of great value to their Associations, and it is to be regretted that some neglect to inform us of the dates and places of their meetings.

Secretaries are earnestly requested to see that their organizations are properly included in the following list:

Name of Organization	Date of Next Meeting	Place of Meeting	Name and Address of Sec'y
Alabama Vet. Med. Ass'n		Birmingham	C. A. Cary, Auburn
Alumni Ass'n College of Vet. Med. O. S. U.		Columbus	W. R. Hobbs, care O. S. U. Columbus, Ohio
Alumni Ass'n N. Y.-A. V. C.	June, 1920	338 E. 26th St.	Adolph Eichhorn, Pearl River
Alumni Ass'n U. S. Coll. Vet. Surgeons	W'k Beg. Nov. 17	Wash., D. C.	Mendham, N. J.
American Vet. Med. Ass'n	Nov. 17-21, 1919.	New Orleans	N. S Mayo, 4753 Ravenswood Ave., Chicago
Arkansas Veterinary Ass'n			R. M. Gow, Little Rock
B. A. I. Vet. Ass'n of Iowa		Ames, Ia.	F. Jelen, Cedar Rapids, Ia.
B. A. I. Vet. In. A., S. Omaha.	3d Mon. each mo.	S. Omaha, Neb.	J. V. Giffee, So. Side, Omaha
British Columbia Vet. Ass'n			K. Chester, New Westminster. B. C.
California State V. M. Ass'n			Geo. H. Hart, Berkeley
Central Canada V. Ass'n			A. B. Wickware, Ottawa
Central N. Y. Vet. Med. Ass'n	June and Nov.	Syracuse	W. B. Switzer, Oswego
Chicago Vet. Society	2d Tu. each mo.	Chicago	A. A. Leibold, Chicago
Colorado State V. M. Ass'n		Fort Collins	I. E. Newsom, Ft. Collins
Conestoga Veterinary Club	2d Thu. each mo.	Lancaster, Pa.	H. B. Brady, Sec'y
Connecticut V. M. Ass'n			A. T. Gilyard, Waterbury
Dominion Vet. Meat Inspectors' Ass'n of Canada	3d Sat. each mo.	Toronto	Wm. Tennant, Toronto
Eastern Iowa Vet. Ass'n	October 8-9	Muscatine	S. E. Houk, Muscatine
Genesee Valley V. M. Ass'n		Rochester	J. H. Taylor, Henrietta, N. Y.
Georgia State V. M. A.			P. F. Bahnsen, Americus
Hudson Valley V. M. A.			W. H. Kelly, Albany
Idaho Ass'n Vet. graduates			C. V. Williams, Blackfoot
Illmo Vet. Med. Ass'n			L. B. Michael, Collinsville, Ill.
Illinois State V. M. Ass'n			L. A. Merillat, Chicago
Indiana Veterinary Ass'n			G. H. Roberts, Indianapolis
Iowa Veterinary Ass'n		Ames	H. D. Bergman, Ames
Kansas State V. M Ass'n			W. J. Guilfoyle, Kansas City
Kentucky V. M. Ass'n		Shelbyville	D. E. Westmoreland, Owensboro
Keystone V. M. Ass'n	2d Tu. each mo.	Philadelphia	E. S. Rockwell
Louisiana V. M. Ass'n			E. I. Smith, Baton Rouge
Maine Vet. Med. Ass'n		Portland	E. E. Russell, Farmington
Massachusetts Vet. Ass'n	Monthly	Quincy House Boston	
Michigan State V. M. Ass'n			F. M. Blatchford, Brighton
Minnesota State V. M. Ass'n		Brainerd	C. P. Fitch, St. Paul
Mississippi State V. M. Ass'n	Feb. 10-11, 1920	Jackson, Miss.	J. A. Barger, Jackson
Missouri Valley V. Ass'n		Omaha, Neb.	R. F. Bourne, Ft. Collins, Col.
Missouri Vet. Med. Ass'n			Chas. D. Folse, Kansas City
Montana State V. M. A.		Butte	A. D. Knowles, Missoula.
Nat'l Ass'n B. A. I. Veterinarians	Meet with A. V. M. A.		S. J. Walkley, 185 N. W. Ave., Milwaukee, Wis.
Neb. Vet. Med. Ass'n			S. W. Alfort, Lincoln
Nevada State Vet. Ass'n		Reno	W. B. Earl, Reno, Nev.
New Jersey State V. M. Ass'n		Asbury Park	
New York S. V. M. Society		Brooklyn	C. E. Hayden, Ithaca
North Carolina V. M. Ass'n			J. P. Spoon, Burlington
North Dakota V. M. Ass'n			W. J. Mulroony, Havana
North-Western Ohio V. M. A.			C. E. Hershey, Tiffin, O.
Ohio State V. M. Ass'n			R. I. Bernath, Wauseon
Ohio Tri-County Vet. Ass'n			Dr. W. R. Lukens, Hillsboro
Ohio Valley Vet. Med. Ass'n			C. S. Henry, Terre Haute
Oklahoma State V. M. Ass'n		Oklahoma City	D. W. Gerber, Okla. City, Ok.
Oregon Vet. Med. Ass'n			B. T. Simms, Corvallis, Ore.
Pennsylvania State V. M. A.		Harrisburg	D. E. Hickman, Phila. Pa.,
Portland Vet. Med. Ass'n	4h Tu. each mo.	Portland, Ore.	Sam. B. Foster, Portland, Ore.
S. Carolina Ass'n of Veter'ns	Sept. 4-5	Columbia, S. C.	B. K. McInnes, Charleston
Schuylkill Valley V. M. A.		Reading	C. R. Potteiger, Reading
South Dakota V. M. A.			S. W. Allen, Watertown
So. Aux. of Cal. S. V. M. Ass'n	3d Wed. Dec., Mar., June, Sept.	Los Angeles	J. A. Dell, Los Angeles
Southeastern Michigan V. M. Ass'n	2d Wednesday Jan. Apr. Jul. Oct.		H. Preston Hoskins, Detroit
Southeastern States Vet. Med. Ass'n		Birmingham, Ala.	H C. Hutchens, Atlanta, Ga.
Southern Tier V. M. A.	July 5	Binghamton	R. R. Birch, Ithaca, N. Y.
Southwestern Mich. Vet. Med. Ass'n			L. A. Winter, Eau Claire, Mich

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TRANSFERABLE MEMBERSHIPS.

Members of the Veterinary Service of the Bureau of Animal Industry are frequently changed from one state to another, and as a rule these members of the profession like to become identified with the veterinary associations of the states in which they may be located. At present, however, it would seem that, no matter how many changes they may be called upon to make in the Federal service, they have to pay dues to each state organization with which they may desire to become affiiated.

Unfortunately, these veterinarians are not generally overpaid —perhaps the reverse in some instances—and their having to pay additional dues for each change of location they make seems not only a hardship on them, but may, and probably does, prevent some of them from identifying themselves with state associations that otherwise might prove mutually beneficial.

This possibility has suggested the idea that reciprocal arrangements might be made whereby these veterinarians could have their memberships in one state association transferred to another when they are called upon to move, in the same year, without having to pay additional dues with each change of location.

At the last meeting of the A. V. M. A. there was a substantial increase in the membership, due largely to the addition of Bureau veterinarians, which cannot fail to strengthen the Association and add to its usefulness. Anything, therefore, that can be done to encourage the Bureau men to affiliate themselves with the state associations, where they may be temporarily located, should, we feel, be done by these organizations. And, while we do not think the payment of additional dues would prevent some from becoming members of state associations, there may be others who might feel it a little severe on their pocketbooks to have to pay dues, for the same year, whenever they are required to make a change from one state to another.

The easiest remedy we can suggest for this condition is for the various state associations to reciprocate in the matter by adopting a system of transferable memberships for such Bureau men.

"DEFICIENCY TROUBLES."

Since attention was first directed to *vitamines* by Casimir Funk, in 1912, and that their absence, or diminished supply, in food was largely responsible for nutrition-deficiency, a considerable amount of work has been done in an experimental way to test the question as to its applicability in practice, not only as regards human nutrition, but also as it applies in the feeding of animals for successful growth and reproduction. So far, the results have been little short of astonishing, and are likely to upset the prevailing theory as to balanced rations, irrespective of the source of their nutrients, being able, adequately, to supply all of the material necessary for the successful upbuilding of tissues in the mature animal, and of those, also, of the young creature *in utero*.

It may be possible, also, we think, that nutrition-deficiency brought about through lack of the necessary vitamine supply in animal feeds, may be responsible for certain unfortunate conditions in breeding herds of cattle that, hitherto, may have been attributed to entirely different etiological factors.

Some time ago Hart, Steenbock and Humphrey, of the Wisconsin Experiment Station, conducted a series of experiments with cattle to test the effect of balanced rations on growth and reproduction. The rations were balanced, in so far as they con-

tained the theoretical amounts of digestible protein, and the required therms of energy, but were composed of different raw materials. In one case the ration was composed entirely of feeds obtained from the corn plant; in another from the wheat plant; in another from the oat plant, etc. When the animals fed the corn plant ration began to reproduce, strong calves were always the result; they were always carried to maturity, and no trouble was experienced at parturition. On the wheat plant ration, the cows were never able to produce normally, the calves were born 25 or 30 days ahead of time, they were undersized and weak, and would never live over four or five days; besides, the mother would frequently fail to properly clean, etc. On the ration balanced from the oat plant, it was demonstrated that a perfect ration could not be made from it alone, as in this experiment the calves were born prematurely, and seldom lived. It should be mentioned that the possibility of abortion disease was eliminated from these experiments, as the herd was under observation by the Station veterinarian, and was found free from that disease during the entire period of the work.

Quite recently the writer was asked by a party in one of the Canadian provinces to give an opinion as to the cause of death of a number of calves in his herd; and the description given was as follows:

> "Last spring I had 32 cows freshen. At present (January 1, 1919) I have only six calves. The calves mostly die when a few days old. Most of them were born with lumps on their jaws. A few came wrongly presented, with their head or legs turned back. A number of cows retained their after-births. Cows have again begun to calve, and the calves are dying as before. Calves stretch out with the head back, breathe hard and die. Cows were pastured in summer on natural prairie grass, and in winter, fed on oat straw, prairie hay and oat-chop; beginning the chop about three weeks before the cow calves."

We were inclined to the opinion, that, in the absence of the infection of abortion disease, nutrition-deficiency might probably be the cause of the trouble; and, while the same method of feeding might have been practiced for a number of years, the long-continued use, without change, of materials deficient in vitamines, those chemical substances in food so absolutely essential for growth and reproduction, might, after a time, seriously interfere with the reproductive powers of the animal.

Lack of space forbids going further into detail; but, as the Wisconsin investigators remark:

"While it is well known that considerable trouble from contagious abortion is often met with in dairy districts, it should also be recognized by breeders that it is possible to produce dead, or weak, premature calves from the improper selection of feeds."

Our main purpose, at this time, however, is to suggest the possibility of sometimes mistaking the effects of nutrition-deficiency, as may be manifested in the offspring of a herd, for abortion disease itself. The study of deficiency troubles is of such recent origin that practitioners, generally, may not, up to the present, have devoted much time to it. Investigations seem to prove, however, that their results may be quite disastrous in the dairy, or other breeding, herd; and as premature births, dead or short-lived calves, etc., may often follow, it is not unreasonable to presume that errors in diagnosis may sometimes be made.

THE NEW ORLEANS MEETING.

A slight change in the date of the New Orleans meeting of the A. V. M. A., from that previously announced, has had to be made, and it is now definitely fixed for the week beginning November 17.

It was found that October 13, the original time fixed, was going to conflict with other large gatherings in New Orleans, notably an International Cotton Conference, which was slated for the same date as the A. V. M. A. meeting. To have held the convention a little earlier would have interfered with many members belonging to veterinary and state colleges leaving home at a time when their institutions were about to open upon their session's work.

To avoid both of these contingencies, the matter was again taken up with the New Orleans authorities, and it was decided that the week beginning November 17 would have nothing to interefere, locally, and all the hotel accommodation necessary would be at the disposal of the A. V. M. A. meeting. The Executive Board has, therefore, decided on the November date, which we believe will suit the much greater number of the membership, and will prove more enjoyable and agreeable in every way. Now that this matter has been definitely settled, we would suggest that members bear the change of date in mind, and that they make their arrangements accordingly.

INVESTIGATIONS TO DETERMINE THE CAUSE OF CERTAIN SHEEP DISEASES IN COLORADO.*

G. H. GLOVER, I. E. NEWSOM, E. W. ALKIRE,
Fort Collins, Colorado.

Owing to an abundance of highly nutritious food, particularly of alfalfa and peas, Colorado has for many years been famous as a lamb-feeding center, and Colorado alfalfa and pea fed lambs have a large place in the stock markets of the country during the late winter and spring. The practice of buying lambs in the fall and fattening them during the winter months began somewhere between 25 and 35 years ago, and has now developed to the point where a million and a quarter are fed each winter.

The particular districts in the State which have gone into this feeding most extensively are northern Colorado between Denver and Cheyenne, taking in the territory contiguous to such towns as Longmont, Loveland, Fort Collins, Greeley and as far east as Sterling. The Arkansas Valley in a less measure has also developed the feeding industry to a high degree. In these two districts it is a common practice to feed alfalfa almost entirely as roughage and to purchase Kansas and Nebraska corn, or more recently barley, to furnish the necessary grain ration. In the San Luis Valley the conditions are quite different from the other two districts because a single crop furnishes both the hay and grain ration. The floor of the valley is approximately 7,500 feet above sea level, and, while alfalfa does well in certain districts, yet the staple crop is field peas. This crop is seldom harvested by machinery, but when the peas are ripe, hogs and lambs are turned into the fields to do their own harvesting. This practice seems to have been going on for some 12 or 15 years, and in general with decided success. It is not surprising that with many men going into the feeding business each year, and with the accumulation of large numbers of lambs, many of which are kept very closely confined for from three to five months at a time, that a considerable loss should occur. In the earlier years of the feeding industry losses were extremely light, and were more frequently the result of lambs in the pens being covered with snow during severe blizzards. In more recent years, however, the losses have in the aggregate become considerable, and in many instances not only the profits associated with the business, but much of the principal

* Presented at 55th Annual Meeting, A. V. M. A., Philadelphia, 1918.

has been lost because of the death of a large percentage of the lambs. For some eight or ten years the Experiment Station has from time to time been called upon to examine into the losses of certain lambs on feed, but until some three years ago no systematic attempt was made to determined the actual causes of death.

EARLY LOSSES.

During the winters of 1914-15 and 1915-16, the losses of lambs in the San Luis Valley on field peas were unusually heavy, so much so that all of the veterinary authorities in the State were called upon to and did make certain superficial investigations to determine the cause of the loss. It was estimated that in this small district more than 5,000 lambs died during each of these two winters. The disease appeared to be confined almost, if not entirely, to lambs, older animals being practically never affected. Visits to the district seemed to show that when the lambs were removed entirely from the pea fields and put on alfalfa hay the loss was reduced to the minimum. However, owing to the large number of peas which had to be used and the small amount of alfalfa, this procedure was not economically feasible. Many men, rather than endure the loss, shipped their lambs to market when only partly finished. The symptoms were quite varied. In the more acute cases, apparently healthy and nearly fat lambs would suddenly throw their heads back, fall, struggle a few times and die, almost as though from an apoplectic stroke. In those cases which survived longer, there was a certain amount of dullness, diarrhœa supervened, and death might follow in from one to eight or ten days. In many instances these animals recovered. Postmortem examination often revealed no lesions whatever. Where lesions did exist, there was frequently present gastro-enteritis, particularly noticeable in the fourth stomach, which showed a deep reddening, and in the first few inches of the duodenum. In many instances swollen and hemorrhagic lymph glands were not uncommon. Some hemorrhages in various parts of the body were often found, and occasionally laryngitis, tracheitis, and even penumonia and pleuritis were to be discovered. From such observations as we were privileged to make, we felt, however, that the most constant lesion was in the fourth stomach and duodenum.

Needless to say, there were various theories to account for the heavy loss, and many contradictions. There were those who believed that mold on the pea vines was responsible, and it was true that where the peas were heavy, mold could be found in

considerable amount. It seemed also true that in many fields where the losses were not heavy, just as much mold could be found. One rather significant statement was brought out, and that was that during the earlier years of raising peas, it had been common practice to plant them with oats as a nurse crop. This, it was stated, resulted in the peas not bearing so heavily, and also in their standing up better, and, therefore, not being so liable to mold. During the years in question, it was stated that no oats had been planted.

On the other hand, there were those who believed that the system of feeding was at fault, and to this view we at the Station were inclined to adhere. On general principles, we looked upon a lamb as being merely a baby of a different species and, knowing that heavy protein feeding often resulted in diarrhœa and dysentery in babies of the human species, we felt that it was quite in keeping to believe that baby sheep when allowed to gorge themselves on such a high protein diet might develop intestinal disorder. We event went so far as to suggest in some instances that if the peas were harvested and fed to the lambs in definite amounts, it might be possible to control the condition. The fact that there was frequently a gastro-enteritis and that a change of feed in most instances resulted in a betterment of the condition, seemed strongly to indicate that the food was a factor. Mitigating against this, however, was the fact that in many fields where lambs were turned on to the fields, with apparently little judgment, and allowed to eat when they would, there was no loss. In other instances, lambs after showing disease in the lot would continue to die, even though they were allowed on the peas not more than ten minutes a day.

In northern Colorado we had from time to time been called upon to determine the cause of losses under entirely different conditions of feeding. One of the most severe losses of which we recall occurred during the winter of 1914 near Erie. (Lot. No. 1.) This man had two lots of sheep in pens approximately a quarter of a mile apart. There were about 1,700 in each lot. They had been brought in some two months previously, had been allowed to clean the beet tops off of one or two fields, after which they had been put into pens and fed alfalfa meal, in which had been sprinkled the grain ration, consisting of corn chop. This was fed in self-feeders. The weather was quite severe. Although both lots were getting food from the same source, there had been a loss of over 300 in one lot; whereas, not more than five or six

had sickened in the other. There were also many others sick in the first lot, so that it is quite probable there was a loss of 500 or 600 before the feeding period was over. Most noticeable symptoms were dullness and a bloody diarrhœa. The lesions were largely gastro-enteritis, with occasional pneumonic cases, and many showing hemorrhagic lymph glands. While the conditions of feeding appeared to be ideal, in following our lead at the time we explained carefully to the owner that lambs, being rather delicate, often obtained too much grain and consequently suffered from gastro-enteritis. We recommended that the grain ration be cut down materially, which was done, but with no decided noticeable diminution in the number of cases of illness.

We were called during the years 1914, 1915 and 1916 to many places, more commonly during the first month of the feeding period, where many lambs were dying. It did not seem to matter whether they were getting barley, corn chop or whole corn; conditions were usually approximately the same. Many would have a diarrhœa, some would die without showing noticeable symptoms and others would recover. The usual loss ran from 50 to 100 out of 1,000. This loss would sometimes take place within the first two weeks, after which there would be little or no loss throughout the feeding period. In other instances, the losses would continue, sometimes gradually, sometimes spasmodically, throughout the four or five months in the pens. We usually recommended a marked decrease in the grain ration and were frequently met with the statement that the lambs had been on feed for two weeks and were only getting a quarter of a pound per head per day. We were usually told also of some neighbor who had increased his grain ration very rapidly and without loss. In some instances, we found that, following the decrease of the grain ration, losses stopped, but upon the addition of any considerable amount they began again, so that, on the whole, it was quite baffling. So long as they did not feed grain there seemed to be little loss, but feeding grain was essential to the industry, and as a consequence many of the feeders cut the Gordian Knot by simply giving a large amount of grain and taking their losses, contending as they did so that it was better to fatten a considerable percentage of the sheep and lose some than to save all and fatten none. Strange to relate, in some of these instances losses stopped even when the feeding of grain was very heavy.

Some other detailed records of these early cases may be advisable at this time.

LOT NO. 2.

A lot of 2,650 Wyoming lambs were first visited on December 24, 1916, near Timnath, Colorado. They had been in the pens for two weeks and at that time were getting three-fourths of a pound of barley a day. The owner explained that he had been feeding sheep for thirteen years, but had never increased the grain ration quite as rapidly as this before. Neither had he had any appreciable loss in previous years. At the time of our visit some 35 lambs had died and a few were showing diarrhœa. Post-mortem examinations were made of two that had died the night previously. Bright red hemorrhagic areas were present in the small intestines and in one of them a highly inflamed fourth stomach. Tape-worms were present in the bile ducts and also in the small intestines. The lungs were normal, but one animal showed a severe laryngitis.

On December 26 the place was visited again. Owner had lost three the previous night. A sick and a dead one were brought to the laboratory for examination. The dead one showed the presence of tape-worms and a hemorrhagic fourth stomach, but no other lesions. Visits were made from time to time during the next month. The lesions in those posted varied from an extensive inflammation of the gastro-intestinal tract with laryngitis, tracheitis and pneumonia to a few pin point hemorrhages in some of the serous membranes. The owner found that when he cut down his grain ration the losses would seem to disappear, but that when he began to increase they began again. Finally he fed them as had been his custom in previous years and took his losses, which amounted to 95 head during the feeding season. It would be possible to add materially to this list of early cases, but without adding any considerable amount of information on the subject. Suffice it to say that between 5,000 and 10,000 sheep are lost annually in the feed lots of northern Colorado and the Arkansas Valley exhibiting some such symptoms and lesions as described above.

FEEDING EXPERIMENTS.

Having developed the hypothesis that irregularity or overfeeding was largely responsible for much of our loss, we outlined an experiment by which we hoped to determine the amount of the various concentrates which would cause death in lambs and the

conditions under which they must be fed in order to result in loss. In the fall of 1916 we purchased a small lot of lambs in order to try out various kinds of feed. Unfortunately for our purpose, these 32 lambs were small, thin and weak. One was dead on arrival, another died the same afternoon and still another on the following day. Nineteen in fair condition were placed in a pen by themselves on December 2, 1916.

The grains selected were corn chop, barley chop and whole shelled peas. The corn and barley were purchased from a local dealer and the peas were obtained from the San Luis Valley. All lambs were given alfalfa *ad libitum.*

Space does not permit of a detailed account of the handling of each one of the lambs, but they were arranged in such manner as to give overfeeding and irregularity a most severe trial. Some of them were started in with two pounds of grain and kept on all they would eat throughout the feeding period. Others were fed for a considerable period of time and then food was withheld for several days, after which it was again given at liberty.

Radical changes were made from corn chop to peas, from peas to barley and from barley to corn chop, so that, altogether, we feel that if it were possible to kill lambs by irregularity or overfeeding we should have had a considerable number of deaths in these lots.

During 1917, two lots of 10 lambs each were used in the work and some radical changes were indulged in. Out of the 39 lambs used in the two years' work only one was lost, but there was little reason to believe that the irregularity or overfeeding had anything to do with the loss, since it died while eating one pound of barley chop, whereas, others time and again received twice this amount. Several of them became indisposed and it was noticed that sometimes following a large consumption of grain there would be some scouring, with a subsequent falling off in the grain consumed. Since these experiments were purposely arranged to give extreme conditions, we were unable to conclude that lambs could be readily destroyed by irregularity or overfeeding with the feeds used: *i. e.,* peas, corn chop and barley chop. Many excellent feeders have said that sheep sometimes overeat, following which they will become slightly indisposed and scour, but these men do not believe that overeating causes death in very many cases.

LATER OUTBREAKS.

Until the fall of 1916, practically all of our experience had been with lambs on grain feed. Since that time, however, a number of cases have come under our observation where the lambs were either receiving no grain at all or only such a small quantity as to be practically negligible. Lot No. 3 was so suggestive as to start us on a new line of investigation entirely.

Lot No. 3, some four and a half miles east of Fort Collins, was visited on November 29, 1916. Altogether, the owner had on feed some 4,000 lambs, but his loss was occurring from a flock of about 500 Mexican lambs that had been shipped in on November 7. They had been running on alfalfa stubble until about a week previous to our visit, when they had been changed to a field of beet tops. The owner had noticed two or three days after turning them into this field that some were not doing well and were sluggish about coming in at night. He said a few were scouring, but not many. Two days previous to our visit he had changed them back to the alfalfa stubble, but had on the day of our visit shut them up in the pen entirely. They had had no grain, but had been fed alfalfa hay at night. About 40 had been lost. On the day of our first visit, we posted eight or nine lambs. Nearly all of them showed a severe laryngitis and in three or four tracheitis. No pneumonic condition was found, but hemorrhagic spots appeared throughout the lungs. In several subpleural and subepicardial hemorrhages were quite constant. In one instance there was considerable hemorrhage under the capsule of the spleen. In one there was considerable edema under the jaw. The fourth stomach was decidedly inflamed and reddened in two or three. The intestines showed spots of severe inflammation in the mucous lining and some subserous hemorrhages. In one the abomasum showed hemorrhages into the leaves. The sheep were in fair condition, weighing about 65 to 75 pounds. One was brought to the laboratory that had died about the time of our arrival. Post-mortem revealed no laryngitis or tracheitis. There was congestion of the lungs and a considerable number of subpleural hemorrhages. Many of the lymph glands were hemorrhagic. The fourth stomach was deeply reddened, swollen and inflamed throughout. The intestines were inflamed in certain areas. Animal was in a good state of flesh. Smears made from the heart blood, pleural hemorrhages, spleen and lung all showed the presence of a bipolar organism. Cultures were made from the heart blood and pleural fluid, revealing a small gram negative

organism in pure culture. A guinea pig and rabbit were inoculated from the heart blood and pleural fluid respectively. The pig died the night of November 30. Smears were made from various organs, but only those at the point of inoculation showed the bipolar bacillus. Cultures from the heart blood of this pig were negative. On keeping the sheep in pens and well bedded, the losses ceased within the next few days.

On February 21 we were called again to this place and informed that during the past week two or three lambs had been lost each day. By this time they were getting one and a third pounds of whole corn per head daily, and about ten days previously he had put them on an eighth of a pound of beet syrup. Soon after putting them on the syrup they began to die, so that on the 16th he discontinued it. The lambs, however, continued to die. The corn did not appear of very excellent quality. The hay was stack-burned, but the owner contended he had been feeding this for some time previously; also it was the same kind of hay that his other lambs were getting where no loss occurred. Two of the animals were posted. One showed extreme inflammation of the abomasum and small intestines. The other a slight inflammation of the abomasum. There were no tape-worms in either. Two sick ones were brought to the laboratory and one was killed that afternoon. This animal was in a comatose state and unable to rise. He had a marked diarrhœa, which was common to most of the sick ones. Absolutely no lesions whatever could be found in this slaughtered lamb except congestion of the brain. Smears from the heart and kidney were negative as far as bacteria were concerned. One made from the lungs showed bipolar organisms, but others were also present.

The other sheep was scouring badly and on excitement would fall and exhibit convulsions. He would later rise, but was very dull. At times his legs would spread, letting him fall to the ground, so that he laid in a straddling position on the ventral surface of the body a share of the time. Fifteen c.c. of blood from this sheep were drawn from the jugular while he was still alive, 13 of which were immediately injected into a normal lamb, the other two were given to a rabbit intraperitoneally. Neither of these animals showed any effects of the inoculation. The disease continued until there had been a loss of 120 lambs.

Lot No. 10.

Consisting of 2,500 Idaho lambs in pens on the outskirts of Windsor. They had been in the pens one week when seen on October 12. Some had scabby lips, while several were noticeably ill. There had been a loss of about 12 head. Weather conditions were favorable. The lambs had had no grain up to this time. Of two posted, both showed a fibrino-purulent pleuro-pneumonia. It was suggested to the owner that the sheep had probably been exposed to untoward weather conditions in transit. A diagnosis of pneumonia was made and the impression left that he probably would not have much further loss. Smears made from the lung tissue brought to the laboratory revealed a bipolar organism. The place was visited again on October 15, at which time he had lost about 20. Four were posted. Of these three showed a pleuro-pneumonia as previously, whereas the other showed a normal lung, but the fourth stomach was decidedly inflamed. Some 20 or 25 head were noticeably sick. They were visited again on October 23. Thirty-six had died by this time and all that were posted showed pneumonia. Smears made from the lungs showed a bipolar organism, and a rabbit inoculated from an emulsion of the lung tissue intraperitoneally on October 23 died on October 27. Smears made from the various organs of this rabbit showed bipolar bacilli, with no other organisms present. The place was visited again on November 6, the loss having been increased to 50. Many of them were scouring, but those that were posted showed pneumonia. Feeling that the disease probably was hemorrhagic septicemia and that there seemed no other way of handling it, we recommended that the whole flock be vaccinated, explaining at the time that no sheep vaccine could be obtained so far as we knew, but that cattle vaccine might be serviceable. We offered to administer the vaccine free if the owner would pay for the material used. One of the sick animals was brought to the laboratory, but died on the way. On the following day, November 7, smears made from the lungs showed a bipolar organism. A rabbit was inoculated intravenously with 2 c.c. of an emulsion made from the lungs. The rabbit was found dead on Monday morning, November 12, and had been dead for some time. Smears made from the various organs showed numerous bipolar bacilli. Cultures made from this rabbit revealed a small gram negative organism. The owner finally decided to vaccinate 500 and accordingly separated out this num-

ber, taking all the sick and any that appeared to be weak. On November 10, the vaccine having arrived, it was given in 2 c.c. doses to 504 animals, including about 40 that were noticeably sick and that had been separated into the sick pens. On November 13, the place was visited again, when report was made that two had been lost since vaccination and that one of these had not been vaccinated, owing to the fact that it was in a comatose state at the time the vaccine was administered to the others. The owner felt that all of the vaccinated animals were looking better and said that no more had sickened.

On November 23, one more animal had been lost and at this time only one was sick. The others appeared well. December 1 the owner had lost four out of the vaccinated sheep all told, but at this time there were 11 sick from the unvaccinated ones. These sick ones were each given 3 c.c. of vaccine. On December 28, he reported that the sheep were all doing well and that only two had been lost since the previous visit, but he felt that these had died from bloating or overcrowding and not from the original disease.

Lot No. 11.

Consisting of 1,100 Colorado lambs in pens four miles east of Berthoud. These were visited on November 9, 1917, at which time they had been in pens about two weeks. A severe storm had struck these sheep a few days after their arrival and since that time 27 had died, although the weather at the time of our visit was pleasant. The alfalfa appeared to be of good quality, in addition to which they were being fed a fourth of a pound of oats per head. Symptoms were coughing and discharge from the nose. A few were scouring, with temperatures from 103 to 106. Post-mortem revealed a severe bronchitis, with a little lobular pneumonia. A few hemorrhages were noted at the base of the heart. There was some redness in the abomasum and subserous hemorrhages of intestines. Smears from the lungs showed a bipolar organism. It was recommended to the owner that he wait a few days and if his losses continued that it would be wise to try vaccination. A rabbit inoculated with a lung emulsion on November 10, died during the night of November 12. Smears from various organs from this rabbit showed a large number of bipolar organisms. Cultures made revealed a small gram negative bacillus.

On December 3, the local veterinarian reported that the owner had lost a few after our visit, but that none had died for about ten days.

On December 7, the owner brought a sick sheep to the laboratory and reported that he had lost 32, and that, while they had stopped dying for a time, he was now losing a few more. He had invested in half a ton of sheep tonic, sold by a certain chemical company, following which there had been no loss for ten days. The sick sheep was slaughtered and a post-mortem showed a very slight bronchitis and a very severe reddening in the fourth stomach. A rabbit inoculated from the heart blood remained healthy. December 16, the owner called up, saying that he was still losing lambs. The place was visited again on December 18. Fully 200 of the lambs were noticeably ill; many were coughing, and a considerable number had a profuse nasal discharge streaked with blood. Vaccine was ordered on this date and administered on the 21st.

December 28, three of the vaccinated lambs had died. Several still showed a discharge from the nose. January 5, three more had died since vaccination. Some were still sick. January 14, he had lost one the evening before. Post-mortem revealed bronchitis, hemorrhages in the lymph glands and many hemorrhages in the serous membranes. There were five lambs noticeably stiff and ill. One of them had a temperature of 105.8.

January 15, one more animal had died. Post-mortem showed numerous hemorrhages between the fore limb and thorax; many subpleural hemorrhages, some of considerable size. The lungs were spotted with hemorrhages. The trachea, bronchi and larynx extremely red and hemorrhagic. The thymus and prepectoral lymph glands were hemorrhagic and swollen. Prescapular lymph gland was normal. Spleen was swollen and black, with many subscapular hemorrhages. Several subperitoneal hemorrhages were noted. Mucous membrane of the fourth stomach was extremely reddened throughout. A rabbit inoculated subcutaneously with a lung emulsion from the sheep posted on January 14, died on the 28th, showing an extensive edematous lesion at the point of inoculation. Bouillon cultures made direct from the spleen and heart blood of the sheep posted on January 15 showed the presence of a bipolar organism; the one from the heart blood being a pure culture, whereas the one from the spleen was mixed with a larger bacillus, later determined to be colon.

January 22, the place was visited again. One lamb had been lost since the previous visit and several were coughing and discharging from the nose. Nine in all had been lost since vaccination.

February 12, the place was visited again, when it was found that four had been lost since the previous visit, making 13 in all since vaccination. One posted showed the usual bronchitis and hemorrhagic lymph glands. July 15, owner stated that 62 were lost altogether during the feeding season, making a loss of 22 head following vaccination. Apparently, in this case, a single vaccination was not successful in stopping the losses. A second vaccination was urged, but was refused by the owner.

Lot No. 12.

Consisting of 790 New Mexico lambs shipped to Windsor and arriving there on November 9. At the time of arrival two were dead in the car and several were scouring. They were visited on November 13, at which time 20 had been lost and as many more were noticeably sick. Many were scouring. No grain whatever had been fed. Post-mortem examination on several revealed a rather severe bronchitis and considerable inflammation in the pyloric end of the fourth stomach. Also inflammation of the first few inches of the duodenum. There was little pneumonia. No laboratory work was done on this outbreak. Vaccination, however, was recommended, and on November 17 approximately 770 lambs were vaccinated. On the 24th, it was stated that two had died since vaccination. By December 28, there had been no further loss.

Lot No. 13.

Consisting of 1,600 young and old sheep on a ranch near Canon City. They were visited by Dr. Charles G. Lamb, State Veterinarian, who reported that some 40 had been lost at the time he saw them. The thoracic and abdominal viscera was shipped to our laboratory, where it arrived on November 27. There was some pneumonia and considerable bronchitis. Smears made from the lungs showed a bipolar organism. A rabbit inoculated with a lung emulsion died on the night of November 30. Smears made from this rabbit showed a large number of bipolar bacilli. Cultures, however, became contaminated with colon bacilli and were finally discarded. Dr. Lamb reported that the symptoms were coughing, followed sometimes by vomiting. There was some discharge from the nose and the breathing was rapid and

labored. Some died within 24 hours after being noticed to be sick. Vaccination was recommended, both from the State Veterinarian's office and from our laboratory, but was not carried out. It was later reported that over 300 of these animals were lost.

LOT No. 14.

A lot consisting of 4,500 sheep on feed near Greeley. These animals had been shipped in from two different sources and at two different times. One lot of 2,100 were New Mexico lambs and had arrived in the pens November 10. Eleven days later the loss began. A local veterinarian was called on the 27th, at which time the loss had been rather heavy. Material was selected and brought to the laboratory at Fort Collins. Hemorrhages were very numerous throughout. Smears made direct from the various tissues brought showed the presence of a bipolar organism. A rabbit inoculated from an emulsion of the heart muscle on November 27 died on December 2. Smears showed bipolar bacilli. The place was visited by us on November 28, at which time some 40 were dead, 10 of which had died the night previously. Two animals were posted. The larynx, trachea and bronchi were extremely reddened and hemorrhagic, with some hemorrhages in the lungs. Subpleural hemorrhages were numerous, particularly along the intercostal arteries. There were large extravasations of blood over the diaphragm, subpericardial and subepicardial hemorrhages; considerable straw-colored fluid in the throax and abdomen; subserous hemorrhages on the spleen and on the intestines. The fourth stomach was deeply reddened throughout. The blood was of a peculiar purplish hue. Vaccine was ordered for the 2,100 and was administered on November 30, at which time 47 had died and 8 or 10 were noticeably ill. On December 4, the local veterinarian reported that six of the vaccinated sheep had died and that two in the other lot were dead. On December 8, 1,100 of the unvaccinated sheep were vaccinated. The owner reported at this time that only four of the vaccinated sheep had died. On December 12, vaccination was finished on the entire flock of 4,500. December 26, it was reported that there had been no further losses.

LOT No. 15.

In the vicinity of Monte Vista, consisting of 1,600 head, had been on pea fields for three months. About 60 head had been lost at the time of our visit, December 22. Symptoms were as follows: They would become delirious, get down, and lie sometimes for several days. Sometimes they would die at once. The

owner stated that a few days before he had changed from a heavy field of peas to a light one and that since that time there had been little loss. However, we found two that were ill and three that had died the night before. The two ill ones were slaughtered for examination, but one showed no lesions whatever, whereas the other showed a severe inflammation of the fourth stomach. The three dead ones showed a rather extreme tracheitis and bronchitis, with hemorrhagic lymph gland and thymus, subepicardial hemorrhages, the stomach and intestines normal. A rabbit inoculated subcutaneously with a lung emulsion from one of these animals remained healthy. Smears did not show bipolar organisms. January 2, this lot was visited by the local veterinarian, at which time about 80 head had been lost. The loss had been so heavy that the owners had decided to ship to market, but, owing to their inability to get cars, some 800 were left in the field; 506 of these were vaccinated, and 300 were left unvaccinated. By January 11, nine days later, 12 had been lost out of the vaccinated lot and eight out of the unvaccinated. On this date all were shipped, so that our records are unfortunately incomplete.

COMMENT.

The above series indicated to us that the grain food had little to do with the losses in question, since in only one of these cases were the animals on a grain ration which could in any way account for the condition. The finding of a bipolar organism that was virulent for rabbits and also the finding of many acute cases giving typical lesions of hemorrhagic septicemia made us feel that *B. ovisepticus* was responsible for much of our trouble. We appreciated the fact, of course, that the *B. ovisepticus* was alone probably not the deciding factor, but that when the sheep were exposed to untoward conditions, particularly when being shipped from one place to another, that this organism might set up just such conditions as we found. It was also possible that in transit they picked up a particularly virulent strain of the organism.

LOSSES IN PREGNANT EWES.

For some years we have had reported to us rather heavy losses in pregnant ewes, particularly at about lambing time. We have usually attributed this to the severity of the weather, lack of feed and other untoward conditions, and we still feel that these are a considerable factor. We shall detail some cases which we have visited during the past winter.

Lot No. 19.

Consisting of 1,500 head of ewes in the vicinity of Las Animas. They had been shipped from Routt County in October and had been kept in their present quarters since that time. They had not been dying rapidly, but altogether some 25 or 30 had been lost out of one pen containing about 500. They were beginning to lamb. The owner stated that only those ewes that had not yet lambed were affected. They had been visited by other veterinarians who were unable to find any very distinct lesions. At the time of our visit, there were 8 or 10 that were noticeably sick, 6 of which were lying on the ground in a comatose state. Some had lain in this condition for ten days or more. The ewes were being fed ensilage, which was blamed for the trouble. It had, however, been withheld from these 500 for over a week, but the others had been continued on it. They continued to die in the one lot and not in the other, indicating thereby that the ensilage was probably not the cause. Post-mortem examination on three or four of the animals that had lain in a comatose state revealed practically no lesions except emaciation. We were, however, informed that those ewes had been in a good state of flesh when taken sick. One that had died the night previous to our visit and was in a good state of flesh showed numerous lesions. There were laryngitis, tracheitis, bronchitis, solidfication of the lower portion of the apical and cardiac lobes of the lungs, subpleural and subepicardial hemorrhages and an extreme reddening throughout the mucous membrane of the abomasum. Kidneys appeared congested and the lymph glands were swollen and hemorrhagic. There was a single fetus in the uterus.

Material from this animal was brought to the laboratory at Fort Collins, where an emulsion was made of the lung and heart blood and inoculated intraperitoneally into one guinea pig and one rabbit, and subcutaneously into one rabbit, 1 c.c. in each case. Ten c.c. of the same material was given intrajugularly to a yearling lamb. These inoculations were made on March 2, 1918. By 10 o'clock the next morning, the rabbit that had been inoculated intraperitoneally and the guinea pig were dead. By the following day the rabbit inoculated subcutaneously was dead. Cultures from these rabbits and the pig gave us a small oval gram negative bipolar staining organism. The inoculated sheep died on March 12. The inoculated sheep developed as follows:

March 4, 1918—Temperature, 104.2. Looks well.

March 5, 1918—Temperature, 105.2. Has good appetite and looks well.

March 6, 1918—Temperature, 103.6. Eating.

March 7, 1918—Temperature, 107.

March 8, 1918—Temperature, 105.4.

March 9, 1918—Temperature, 106.2.

March 10, 1918—Temperature at 9:30 a. m., 106; 5:45 p. m., 102. Not eating.

March 11, 1918—Temperature 8:30 a. m., 105.5. Not eating. 4:45 p. m., 105. Dull. Not eating. Lying down most of the time.

March 12, 1918. Temperature, 104. Very dull. Breathing labored. Lies most of the time. Not eating. 3:45 p. m., died.

Post-mortem examination made within 30 minutes of death as follows: Several hemorrhages on either side of the lower portion of the thorax. All lymph glands appeared normal. Larynx normal, trachea slightly injected. Two or three small abscesses in left lung, with correspondingly inflamed areas on costal pleura. A considerable number of pin point hemorrhages throughout right lung. Left pleura showed advanced suppurative pleuritis throughout its entire surface. A considerable amount of ill smelling fluid in the left pleural cavity. Many subepicardial hemorrhages practically covering the whole ventricular surface of the heart. The leaves of the fourth stomach were deeply reddened, but the walls appeared normal. Duodenum was deeply reddened for several inches. A rabbit inoculated intravenously from emulsion of the lung of this animal was found dead the next morning. Cultures from this rabbit showed the presence of a bipolar gram negative organism.

Vaccination of the ewes was recommended and carried out by the local veterinarian and reported as follows: 1,301 sheep were vaccinated, after a loss of 46, with 6 sick at the time of vaccination. Of these 6, 5 died subsequently. No animals sickened for a period of two weeks following vaccination, at which time the disease appeared to break out with more virulence than ever, when 20 died within a week. Two hundred and eighty-seven of this lot were revaccinated at the end of the third week, using 1 c.c. per dose. Of the 943 which were not vaccinated, 10 were lost. The records of those revaccinated are as yet incomplete.

Lot No. 18.

A lot of approximately 500 lambing ewes had been shipped from Routt County in October, 1917. In November a few had been lost, but they stopped dying until January, since which

time the loss has been approximately 35. They were visited on March 1, 1918. The owner had previously written describing the symptoms. He had said that they showed delirium, threw the head back as though there was some brain disturbance. Temperatures on the sick sheep varied from 102 to 104. There were 8 or 10 noticeably ill at the time of our visit. Four animals were posted, two of which were slaughtered for the examination. Those that were slaughtered showed few lesions. One of the dead ones had undergone such decomposition that nothing satisfactory could be determined. The other, however, showed practically the same lesions as the one described under Lot No. 19, except that there was no pneumonia. The heart and lungs were brought to the laboratory, where, on March 2, 1 c.c. of a lung and heart blood emulsion was given intraperitoneally into a guinea pig and a rabbit, and 10 c.c. intrajugularly into a lamb, weight 55 pounds. By 10 o'clock the next morning, March 3, all three of these inoculated animals were dead. Cultures from all three revealed typical bipolar organisms, as did the smears. Post-mortem on the lamb revealed the following: Many subcutaneous hemorrhages. Both prescapular lymph glands deeply reddened, swollen and hemorrhagic. Trachea and bronchial tubes were deeply reddened and a few subpleural hemorrhages in the lungs. Subpleural hemorrhages numerous along either side of the spine and in the intercostal spaces and also along the sternum. The heart, particularly at the auriculo-ventricular groove, was studded with hemorrhages. The fourth stomach was deeply reddened throughout its mucous membrane, as was also the first few inches of the duodenum. Kidneys were congested and there were a few small hemorrhages on the outer surface of the bladder.

A sheep was inoculated intrajugularly with 10 c.c. of a suspension of the heart blood of the above lamb, also a rabbit intraperitoneally with 1 c.c. of the same material. The rabbit died on the 8th, culture from which revealed the usual bipolar organism.

The record of the inoculated sheep is as follows:

March 5, 1918—Temperature, 104. Looks well.

March 6, 1918—Temperature, 103.8.

March 7, 1918—Temperature, 105.5.

March 8, 1918—Temperature, 106.2.

March 9, 1918—Temperature, 103.8.

March 10, 1918—Temperature, 104.3 at 9:30 a. m., 105.6 at 5:45 p. m.

March 11, 1918—Temperature, 103.4 at 8:30 a. m., 104.8 at 4:45 p. m.

March 12, 1918—Temperature, 103.7.

The temperature varied between 103 and 104 until March 24, 1918, when it was not further taken. The sheep appeared entirely healthy.

Cultures from this outbreak were used for later work which will appear in a separate place.

Four hundred and twenty-five of these sheep were vaccinated, at which time 7 were ill and 40 had died. Six of the sick ones died following vaccination. No further ones sickened for two weeks. During the third week, the disease broke out again and 12 head died. Two hundred and thirty-five were revaccinated. Four or five were sick at the time of revaccination, all of which died, but none has sickened or died since.

(TO BE CONTINUED.)

ADDRESS.*

Chairman J. G. WILLS, Albany, New York.

(Section on Sanitary Science and Police.)*

We have again gathered to consider matters pertaining to sanitary science and police measures for the control of the infectious diseases of domestic animals.

The attitude of those present will, no doubt, have considerable bearing on future measures and regulations for the elimination of these important maladies from our flocks and herds.

In these times, with so many thousands of men and women taken from their usual occupations and placed under new and strange surroundings, many of them in destructive rather than constructive activities, it becomes necessary to conserve more carefully both plant and animal life in order that our people be fed. Under such circumstances it is most important that we secure the maximum animal production.

We, as members of a profession intimately connected with a great industry, are in a favorable position to render efficient service at this important period. Favorable conditions exist for unscrupulous persons taking advantage of the existing diminution in the number of practicing veterinarians and to attempt to introduce among our live stock such infections as foot and mouth, contagious pleuro pneumonia, or rinderpest. Our enemies

* 55th Annual Meeting, A. V. M. A., Philadelphia, 1918.

could cripple our animal industry, particularly in relation to the production of meat and leather, in no more effective way than by deliberate distribution of the virus of some of the most serious infections in large breeding communities. The veterinary profession, as well as those allied with it, are not in position to meet such a contingency at this time as effectively as under ordinary conditions. Our already overburdened government and state sanitarians, as well as the practitioner, are so occupied with the ordinary abnormalities of live stock that any additional demands upon them could not be well met at this time. It is consequently important that we be especially vigilant to guard against these dangers, using every means to avoid such a possibility, rather than be placed at a disadvantage by attempting to check it after it appears. Our live stock industry demands the fullest possible protection from such attacks at this time, since the demands upon us for meat, milk, wool and leather are so great that each preventable loss adds to the burden of ourselves and our allies. Every productive animal removed from economic usefulness affects, to some extent, the situation here or abroad. It may be a reduction in food, in clothing or in some item of equipment, and in itself may be infinitestimal in extent, but if we multiply the one by thousands or tens of thousands it becomes a serious menace to many essential industries vital to the welfare of the country.

The systematic reduction in the number of animals dying or becoming inefficient in production, due to preventable disease or injury, has come to be one of the most important functions of the veterinarian. The prophylactic features of his work have become more important than formerly, when treating the sick rather than preventing their becoming so was looked upon as the chief function of medicinal practice.

This Association is in a position to render great service in connection with increasing food production, as well as in control of the infectious diseases of animals. Its membership, covering every section of the country and comprising every branch of the profession, is most representative. Our influence upon animal owners has much to do with the increase in live stock production, which at this time is most important.

The future of animal industry looks very encouraging at this time. This country must become the principal market for breeding animals to replenish the decimated herds of continental Europe.

Our animals must furnish the seed stock for those countries where war has caused the destruction of native herds. We are in a position to command an important position from a business standpoint, if we can furnish purchasers good stock, give them reasonable assurance of freedom from disease at prices that will attract buyers from other countries. Cattle, horses, sheep, swine, poultry, and, in fact, every kind of farm animal, will be in demand. Our position as a stock-raising nation will be enhanced by the responsibilities we will be called upon to meet.

It is a foregone conclusion that our prestige in this connection will be largely in proportion to the efficiency of our work as veterinarians and sanitarians in eliminating diseases in our domestic animals. Our responsibility as professional men makes necessary the control of these maladies through scientific rather than haphazard methods.

By closer association with stock owners and breeders we may do much to bring this profession into closer coöperation with those who are so intimately associated with us.

It is upon those who have left their homes and business, often at a great sacrifice, that we must depend for the upbuilding of the profession in the army and the control of diseases among animals used for military purposes which have such an important bearing on the successful prosecution of the war. We have cause to feel justly proud of the personnel of the Army Veterinary Corps and those who have made possible this efficient organization should receive the commendation of this Association in every possible way.

We will now pass to the regular program provided for this Section on Sanitary Science and Police.

PRACTICAL METHODS OF TREATMENT FOR WORM INFESTATION.*

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This paper will deal as briefly as possible with a dozen of the more important worm parasites affecting horses, cattle, sheep, swine, dogs, cats and poultry. It will approve the use of perhaps a half-dozen drugs. It will deal with nematode worms primarily. In the belief of the writer, this is a practical paper. There is a

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disposition among practitioners to regard laboratory men as impractical. As a laboratory man, it is the writer's belief that as regards the use of anthelmintics the practitioner is frequently highly impractical in that he often uses inefficient measures in place of equally feasible effective ones. The determination of the value of anthelmintic medication in practice is not always a simple and certain procedure. Under what we may call barnyard, stable, hog-pen and kennel conditions, it is not always easy to ascertain what worms are passed. There are too many complications. The manure of one animal is mixed with that of other animals, and that of one day with that of other days. The farmer or the stable hand is commonly uncertain as to just what has happened and neither their observation nor their judgment can be trusted in many cases. The technique of examination necessary under such circumstances is crude and unsatisfactory. Poking in the manure with a stick gives a minimum amount of information. The number of worms passed may sometimes be ascertained or guessed at, if the worms happen to be large ones, but the number left cannot be readily ascertained and clinical evidence of recovery from a sub-chronic afebrile state of malnutrition and impoverishment, such as is commonly present in clinical cases of parasitism, comes slowly and such evidence can seldom be sought for by the busy practitioner. Under these circumstances, drugs of but little anthelmintic value become established as anthelmintics. Strictly speaking, treatment with such drugs is not practical treatment.

These are conditions practically inseparable from the practice of veterinary medicine and no criticism can be fairly leveled at the practitioner on that score. What we need in this case are dependable anthelmintics, with an efficiency established by numerous tests under experimental conditions. This is the task of the laboratory man. It is a task that has been undertaken, but only a small part of the work has yet been done. Part of what I may say today will probably prove to be premature in the light of what we will know next year, but if we waited till we knew everything about a subject before telling it, rather than tell the little we know, our progress might be surer, but it would undoubtedly be much slower.

Critical laboratory tests of numerous reputed anthelmintics, and there are hundreds of substances that have had anthelmintic value claimed for them, show that most of the anthelmintics have less value, often much less, than is commonly assigned to them,

while a few prove on critical test to have the value which clinical evidence has attributed to them. These results naturally lead to skepticism in regard to the actual value of untested anthelmintics. By a critical test I mean the administration of the drug to experiment animals under fixed conditions, the subsequent collection of all feces passed, the careful collection of worms from such feces daily for a period of four or more days, and, finally, the killing of the experiment animal at the end of the experiment and the post-mortem collection of all parasites not removed in order to ascertain where the treatment failed, as well as where it succeeded. Most of the recommendations I wish to make are based on such tests, and where they are not, I make my recommendations with reservations.

The horse is infested with a number of worms, of which we will consider only the strongyles, pinworms and ascarids.

The strongyles of the horse include several genera, but the two genera of importance in the large intestine are the genus *Strongylus,* sometimes called *Sclerostomum* (the large red palisade worms), and the genus *Cylicostomum,* also called *Cylichnostomum* and *Trichonema* (the small worm from the large intestine). The latter genus includes a rather large number of species which have been lumped under the name *Strongylus tetracanthus* or *Sclerostomum tetracanthum.* There are 3 species of *Strongylus* commonly present in horses, *Strongylus equinus, S. edentatus* and *S. vulgaris.* Species of both genera are commonly present in the same animal and often in large numbers. The disease due to the presence of the strongyles of both genera has been called stronglidosis by Leneveu. It is an afebrile, wasting disease, characterized by digestive disorders, debility, anemia and edema, and complicated by the many serious sequelæ resulting from aneurism production by *S. vulgaris.*

The importance of our horses for cavalry, field artillery and transport purposes at this time, the value of these horses by the time they arrive in France, and the prevalence of strongylidosis make the subject of treatment for this disease a matter well worthy of our consideration.

It is generally understood that these worms are hard to remove, and on that point the veterinary practitioner and the parasitologist are in agreement. It is, therefore, somewhat surprising to learn that, on the contrary, these worms are not particularly difficult to remove. In tests which I made in collaboration with Dr. R. H. Wilson and Mr. Meyer Wigdor, we

obtained very high anthelmintic efficacy in the treatment of strongylidosis. The results of our experiments are detailed in a paper which is already in press, but I will give a synopsis of those results here.

We secured the removal of every *Strongylus*, 107 of them, from a horse that had fasted over 24 hours, by the administration of 16 mils of oil of chenopodium, followed immediately by a quart of linseed oil. We removed 96 per cent of the *Strongylus* present, 66 out of 69, from a horse that had fasted over 24 hours, by the administration of 16 mils of oil of chenopodium, followed 2 hours later by a quart of linseed oil. We removed 95 per cent of the *Strongylus* present, 78 out of 82, from a horse that had been fasted over 24 hours, by the administration of 3 6-mil doses of oil of chenopodium at hour intervals, followed an hour after the last dose by a liter of linseed oil. We removed 76 per cent of the *Strongylus* present, 61 out of 80, from a horse that had been fasted less than 24 hours, by the administration of 16 mils of oil of chenopodium, followed immediately by a quart of linseed oil. We removed 48 per cent of the *Strongylus* present, 102 out of 214, from a horse that had been fasted less than 24 hours, by the administration of 2 ounces of turpentine in a quart of linseed oil. We removed less than 1 per cent of the *Strongylus* present from one horse that received 18 mils of oil of chenopodium and a quart of linseed oil after fasting less than 24 hours; from a second horse that received 18 mils of oil of chenopodium and a quart of linseed oil after fasting less than 24 hours; from a third horse that received 8 mils of oil of chenopodium and a quart of linseed oil after fasting 24 hours; from a fourth horse that received 2 drams of tartar emetic in a mash daily for 5 days; and from a fifth horse that received 2 drams of iron sulphate in a mash daily for 7 days. The foregoing shows that 96 and 100 per cent efficacy were secured by the use of 16 mils of oil of chenopodium, followed immediately or 2 hours later by a quart of linseed oil, in animals that had been fasted over 24 hours. In these cases, the horses were given a light feed in the evening and all hay and bedding removed. No food was given the next day. The next day the treatment was given early in the morning and the animal not fed for 3 hours afterward. Where animals were fed the morning before treatment, equally good results were not obtained.

With approximately the same size of dose, the efficacy fell to 76 per cent in one case and less than 1 per cent in another. With

smaller doses, 10 mils and 8 mils, the efficacy remained below 1 per cent. It would appear from this that doses of about 16 mils of oil of chenopodium were needed and that the animal should be fasted over a period of almost 36 hours to insure the best results. The one experiment with turpentine, securing in 2-ounce dose in a quart of linseed oil the removal of 48 per cent of the *Strongylus* present in a horse fasted for less than 24 hours, indicates that we have in turpentine a fairly effective substitute for oil of chenopodium when the latter is unobtainable.

Some experiments I performed previous to the experiments noted above bear out our findings in a general way. Horse No. 1 was given 8 mils of oil of chenopodium, followed immediately by a liter of linseed oil, after fasting for less than 24 hours. The treatment removed 51 per cent of the *Strongylus* present, 19 out of 37. Horse No. 2 was given 16 mils of oil of chenopodium, followed immediately by 800 mils of linseed oil, and 100 mils of castor oil, after fasting for 24 hours. The treatment failed to remove any *Strongylus*. Fifteen days later this horse was given 20 mils of chloroform, followed in 15 minutes by 750 mils of linseed oil. The animal had been given some feed shortly before treatment. This treatment also failed to remove any *Strongylus*. The animal was killed 6 days later and found to have 3 *Strongylus* in the cecum. The explanation for the failure of treatment here probably lies in the presence of a very small number of *Strongylus*, perhaps safe in a remote part of the cecum. Horse No. 3 was given 12 mils of oil of chenopodium, followed by 800 mils of linseed oil, after fasting for 24 hours. The treatment failed to remove any *Strongylus*. Six days later the horse was given 2 doses of 20 mils each of carbon bisulphide at a 2-hour interval, followed by 800 mils of linseed oil two and a half hours later. This treatment failed to remove any *Strongylus*. Eight days later the horse was given 3 doses of carbon bisulphide, 3 drams to the dose, at hour intervals. Sixteen days later the animal was killed and found to have 12 *Strongylus* in the cecum. The failure of the treatment here may have been due to the size of the dose, the fasting period, the presence of a few *Strongylus* in a remote portion of the cecum, or to the development of sexually mature forms from agamic worms attaining the intestine between the time of treatment and the time of death. Horse No. 4 was given 20 mils of carbon bisulphide, followed by 800 mils of castor oil one and a half hours later. The treatment failed to remove any *Strongylus*. Five days later the horse was

given 12 mils of oil of chenopodium, followed immediately by 800 mils of linseed oil. The horse passed one *Strongylus*. Seven days later the horse was given 3 doses of carbon bisulphide, of 3 drams each, at hour intervals. No worms were passed and the animal was killed 10 days later. There were 13 *Strongylus* postmortem, so the treatment with chenopodium was 7 per cent effective and those with carbon bisulphide entire failures.

So far as conclusions may be drawn from the 14 experiments noted here, and we must draw what conclusions we may, since this represents almost the entire body of dependable tests available to date, we may say that apparently *Strongylus* may be removed from horses with a rather high degree of certainty with doses of 16 to 18 mils of oil of chenopodium, followed immediately or after an interval by a quart or more of linseed oil, provided the animals have been fasted for a period of 36 hours. It would perhaps be good practice to repeat the treatment at an interval of 2 weeks.

The removal of *Cylicostomum* was even more readily accomplished in our experiments. We secured the removal of every *Cylicostomum* from 4 horses. In one of these cases the horse fasted less than 24 hours, received 16 mils of oil of chenopodium, followed immediately by a quart of linseed oil, and passed 70 *Cylicostomum;* in another case the horse fasted over 24 hours, received 16 mils of oil of chenopodium, followed 2 hours later by a quart of linseed oil, and passed 540 *Cylicostomum;* in the third case the horse fasted over 24 hours, received 3 6-mil doses of oil of chenopodium at hour intervals, followed an hour after the last dose by a liter of linseed oil, and passed 1,242 *Cylicostomum;* in the fourth case the horse fasted less than 24 hours, received 2 ounces of turpentine in a quart of linseed oil, and passed 274 *Cylicostomum*. We removed 97 per cent of the *Cylicostomum* present (or perhaps 100 per cent, if these larval forms had issued from their cysts in the mucosa after the passage of the anthelmintic, as seems likely), 77 out of 79, or 77 out of 77, as the case may be, from a horse that had been fasted over 24 hours, by the administration of 16 mils of oil of chenopodium, followed immediately by a quart of linseed oil. We removed 29 per cent of the *Cylicostomum* present, 187 out of 635, from a horse that had been fed shortly before treatment, by the administration of 10 mils of oil of chenopodium, followed immediately by a quart of linseed oil. We removed 11 per cent of the *Cylicostomum* present, 428 out of 3,623, from a horse that had been fasted less than 24

hours, by the administration of 18 mils of oil of chenopodium, followed immediately by a quart of linseed oil. We removed less than 1 per cent of the *Cylicostomum* present from 1 horse that received 8 mils of oil of chenopodium, followed immediately by a quart of linseed oil, after fasting less than 24 hours; from a second horse that received 2 drams of tartar emetic in a mash daily for 5 days; and from a third horse that received 2 drams of iron sulphate in a mash daily for 7 days.

From the foregoing it may be concluded that in amounts of 16 to 18 mils oil of chenopodium in 1 to 3 doses, followed immediately or at an interval by linseed oil, may be expected to remove all or nearly all strongyles from the cecum and colon of the horse in many cases, provided the animal is fasted 36 hours previous to treatment.

Infestation with *Oxyuris equi,* or pinworm, is not an uncommon condition in horses and may be suspected when horses are seen rubbing the tail against some object or when such a practice is indicated by the presence of a bare spot where the hair has been rubbed off the tail near its root. The presence of these worms may also be suspected when yellowish egg masses are found around the anus, as a result of the crushing of the gravid female by the anal sphincter. In a recent paper, the eminent French parasitologist, Railliet (1917) states that this worm is readily removed. He notes the use of internal medication by mouth, but believes that the easy way to remove pinworms from the horse is by means of copious enemata of warm, soapy water or vinegar water, to which may be added corrosive sublimate to make a 1:2000 solution, or a mucilaginous emulsion of thymol, the enemata to be repeated as often as necessary. The treatments noted by Railliet as used in oral medication are as follows: Tartar emetic in doses of 15 to 20 grams in food; corrosive sublimate in doses of a deciliter of a 1:1000 solution daily in drink or food for about 15 days; areca nut, freshly ground, in 100-gram doses; and thymol, in 15- or 20-gram doses, suspended in mucilage.

In our experience, the removal of pinworms by means of oral medication was very easily accomplished, as a rule. In the tests in collaboration with Wilson and Wigdor, we removed 100 per cent of the pinworms present in 5 horses by the following treatments: Oil of chenopodium, 16 mils, followed immediately by a quart of linseed oil, the horse being fasted for over 24 hours; oil of chenopodium, 16 mils, followed 2 hours later by a quart

of linseed oil, the horse being fasted over 24 hours; oil of chenopodium, 3 6-mil doses at hour intervals, followed an hour after the last dose by a liter of linseed oil, the horse being fasted for over 24 hours; turpentine, 2 ounces, followed immediately by a quart of linseed oil, the horse being fasted less than 24 hours; and by tartar emetic, 2 drams daily in the feed for 5 days. We failed entirely to remove the few pinworms present in 2 cases. In one of these cases the horse received 18 mils of chenopodium, followed immediately by a quart of linseed oil, the horse being fasted less than 24 hours; in the other case the horse received 2 drams of iron sulphate daily in the feed for 7 days.

The above experiments confirm the idea expressed by Railliet as to the readiness with which pinworms may be removed. They may be cleaned out by oil of chenopodium in 16-mil doses, followed immediately or after an interval by a quart of linseed oil, in horses that have been fasted over 24 hours, by 2 ounces of turpentine, followed immediately by a quart of linseed oil in horses that have fasted less than 24 hours, or by 2-dram doses of tartar emetic in the feed daily for 5 days. So far as we can judge from so few experiments, fasting less than 24 hours interferes with the efficacy of oil of chenopodium against these worms, and iron sulphate in 2-dram doses daily for 7 days is unsatisfactory.

The writer has been under the impression for some years that the removal of ascarids, the large maw-worms, of the horse should present no special difficulties, since ascarids in man, dogs and swine yield so readily to treatment. However, test of treatments have led to the conclusion that Neveau-Lemaire (1912) was quite right in stating that none of the numerous treatments commonly employed, such as tartar emetic, turpentine, santonica, empyreumatic oil, and benzine, give satisfactory results. We failed to remove any ascarids from 4 infested animals treated as follows: One horse received 8 mils of oil of chenopodium, another 10 mils, and a third 16 mils, the chenopodium being followed immediately by a quart of linseed oil; the fourth horse received 2 ounces of turpentine, followed immediately by a quart of linseed oil. All of these horses were fasted less than 24 hours. A horse which received 2 drams of tartar emetic in feed daily for 5 days passed 8 per cent of its ascarids; one that received 16 mils of oil of chenopodium, followed immediately by a quart of linseed oil, the horse being fasted over 24 hours, passed 3 per cent of its ascarids; one that received 18 mils of oil of chenopodium, followed immediately by a quart of linseed oil, the horse being fasted less than

24 hours, passed 12 per cent of its ascarids; and one that received 3 6-mil doses of oil of chenopodium, followed an hour after the last dose by a liter of linseed oil, the horse being fasted over 24 hours, passed 25 per cent of its ascarids.

In view of the above results, the writer is unable to make recommendations in regard to treatment for ascarids in the horse. Numerous treatments are known to me, and are said to be effective. Doubtless some of these treatments are effective, at least at times, but until their value has been experimentally demonstrated I would feel no confidence in them personally and would prefer to suspend judgment on this topic pending further investigation. Chenopodium is specifically ascaricidal in man, dogs and swine, and has a very high anthelmintic value. Its low efficacy against ascarids in the horse, in the dose used and in the way it was given, was a surprise. It is possible that a variation in dosage or mode of administration, such as giving a larger number of fractional doses over a longer period, may secure satisfactory results. I have found such consideration necessary in securing a satisfactory chenopodium treatment for hookworm in the dog, but given such consideration a satisfactory treatment is possible. Railliet (1915) says the preference among practitioners is for tartar emetic or arsenic to remove ascarids from the horse. Tartar emetic has the disadvantage of being a severe gastro-intestinal irritant and dangerous. Experimentally, I have found treatment with repeated doses of arsenic a slow and not very certain procedure.

As far as cattle are concerned, the only parasite I care to touch on at this time is stomach worm. This is the same worm that infests sheep, and just as the stomach worm does the greatest damage to lambs among sheep, so it does its greatest damage to calves among cattle. In districts where stomach worms are plentiful in sheep, it is practically certain that they will be plentiful in cattle, and under these circumstances calves should be treated for stomach worm. Experimental tests to determine the efficacy of treatments and the doses required are lacking as far as stomach worm in cattle is concerned. However, we know that the copper sulphate treatment is highly efficacious and safe against stomach worm in sheep, and we may assume that the same treatment would be efficacious and safe against stomach worms in another ruminant in the appropriate dose, which dose can be computed reasonably well from the dose for a sheep. I prefer safe and conservative doses, repeated at long enough

intervals to allow subsiding of inflammation and to avoid cumulative effects, to large doses. So I would start my dose for calves around 100 mils of 1 per cent solution in water for animals 2 to 3 months old, grading the dose up conservatively from this point, and repeating treatment at intervals of a month or 6 weeks from spring until after frost. The dose can be given with a metal dose syringe to calves under proper restraint or if the number warrants it, more elaborate devices for administering the dose may be used.

Stomach worm in sheep is a well-known and serious pest. There are a number of treatments which have been recommended, among which may be mentioned the gasoline treatment, the creosote treatment and the copper sulphate treatment. In my opinion, the fact that gasoline is volatile and apt to enter the lungs and that it must be given three times in such comparatively expensive vehicles as milk, and in large amounts, precludes its use so long as there is anything else that is free from these drawbacks. Most of the experiments on which I base my objection to gasoline and creosote have been published by Hall and Foster (1918). In the same paper will be found the experiments showing the advantages and efficacy of the copper sulphate treatment.

The copper sulphate treatment for stomach worms in sheep was devised by Hutcheon in South Africa and was very thoroughly tested. His reports cover the administration of the treatment to 23,000 sheep and show the good clinical results and the freedom from worms postmortem of sheep so treated. Our work in the Bureau of Animal Industry convinced us of the excellence of this treatment. Hall and Foster (1918) noted the use of 50-mil doses for lambs under 12 months old and 100 mils for those older, and described and figured an apparatus for administering the treatment. I am under the impression, based on our experiments and on some additional evidence obtained in Virginia and in Michigan in the control of stomach worms in sheep and goats, that stomach worms can be readily kept under control, at a point where it will have no discernible effect on the health of the sheep and perhaps even be eradicated from the range involved, by the administration of 50 mils of 1 per cent solution of copper sulphate every month or so except during the winter in localities where winter means freezing weather.

I have modified the apparatus originally described by Hall and Foster and now use this modification. This uses a shorter,

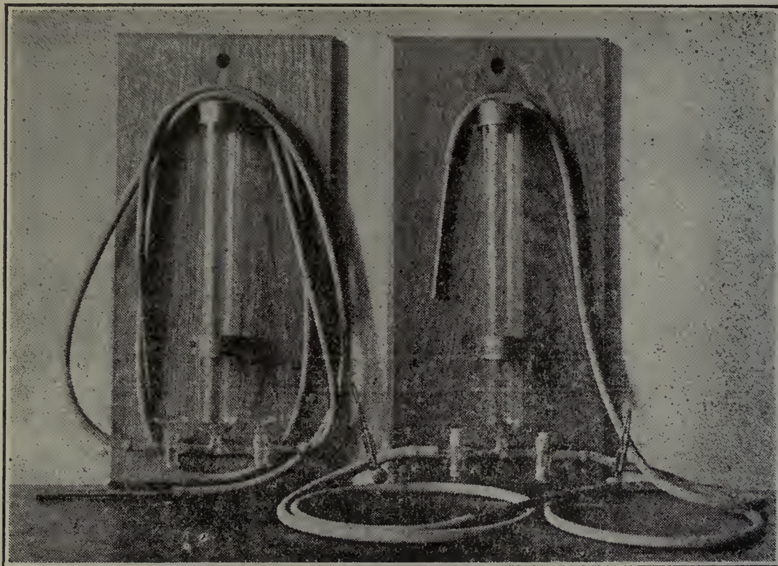

Fig. 1. Apparatus for drenching sheep for stomach worm. The apparatus at the right is the one with clip control on tubing.

thicker tube for the sake of compactness, is mounted on a board for the sake of convenience in hanging it up and in protecting the glass, has the inlet and outlet in glass as an integral part of the construction, partly for the sake of appearances and partly for the increased efficacy. Some earlier modifications use a glass control valve (Fig. 1), but this was too fragile and the present apparatus, like the original, uses the clamp on the rubber tube. All apparatus is fed from a reservoir through one tube and delivers the dose to a metal tube, which is inserted in the sheep's mouth.

It is commonly stated by authorities that the copper sulphate crystals used in making this solution must be clear blue crystals, those having white patches or crusts on them to be rejected. In looking over my papers, I do not find the reason for this. I have heard some reasons assigned, among others that the white patches were oxidized or insoluble, which is not the case, as the white patches represent copper sulphate which has lost part of its water of crystallization through efflorescence on exposure to air. Another reason which might be assigned, and this is perhaps the true reason, is that the loss of this water makes a difference in the amount of copper sulphate necessary in making up a solution,

so that the weight of blue crystals, containing a rather large amount of actual $CuSO_4$ as the same weight of whitish material containing less water of crystallization. The fresh blue crystals of copper sulphate are $CuSO_4$, $5H_2O$; on exposure to air the light-colored patches form and these have the formula $CuSO_4$, $2H_2O$. At 100 C., $CuSO_4$, H_2O is formed and at red heat $CuSO_4$. The differences in weight of these various forms of copper sulphate make considerable difference in the amount required to make a 1 per cent solution or any given strength. Thus to make a quart of the 1 per cent solution would require 0.946 gm. of the blue crystals, 0.747 gm. of the blue white powder formed on the crystals by efflorescence, or 0.6 gm. of the anhydrous copper sulphate formed at red heat. Hence in making a solution, it is important to know what strength is being made, and one should use only one sort of copper sulphate to insure this. The copper sulphate solution resulting, if of the required strength, will be the same, no matter what form of the salt is used.

Nodular worm infestation in sheep is a serious disease which I mention only to express the opinion that we have not as yet established a really satisfactory treatment for it. In our experiments in the Bureau of Animal Industry, Hall and Foster found an efficacy of 17 per cent for chloroform and castor oil, 16 per cent for gasoline in milk, 9 per cent for chenopodium, 0.6 per cent for copper sulphate solution, and 0 per cent for powdered copper sulphate in capsule, and petroleum benzin in milk. The presence of the complex ruminant stomach and the fact that the adult nodular worm is in the cecum and colon remote from the mouth are facts that make oral medication for nodular worm a difficult matter. The bulk of the injury due to the worm is done in the larval stage, so that the removal of the adult worm, if accomplished, probably does little for the sheep, unless the anthelmintic treatment is part of an eradication program contemplating adequate prophylaxis as well. Rectal medication might be used for the removal of the adult worms, but this is a slow procedure and less apt to be practical than oral medication.

Railliet (1915) notes the use of such a method by Brumpt. A preliminary dose of 25-30 gms. of sulphate of soda is given to the sheep to render the stools fluid. This being accomplished, the sheep is suspended by its hind legs and given a rectal injection of 1-1½ liters of water containing a thymol emulsion with the thymol at the rate of 1 gm. for each 3-5 kilos of weight of sheep; the anus is then held closed and the abdomen manipulated in

such a way as to make the lavage penetrate and rinse out the intestine. This method is perhaps suitable for the patient workers of Europe with their sheep scattered in small flocks over many holdings, but it is not well adapted to the American temperament or the large flocks in this country.

The worm which is most generally recognized as a common drawback to swine-raising is the ascarid. These worms are extremely common in swine and are often present in large numbers. They are large worms and frequently may be seen in the intestines of swine at abattoirs in such numbers as to distend the small intestine, forming a sort of sausage with worms for the stuffing. In the experiment work carried on at Washington, chenopodium was found superior to any other drug for the removal of these worms. Oil of chenopodium may be used in about this dosage: Give pigs 1 mil of the oil for every 25 pounds of weight of pig up to 8 mils, following the dose immediately by a purgative, such as an ounce of castor oil for animals weighing up to 100 pounds, and double this amount for those weighing over 100 pounds. Be sure the animal is fasted a full 24 hours before treatment and not fed for two or three hours after treatment. The writer has seen abundant evidence of the necessity for observing this rule. Restraint for pigs is a more or less vexatious problem, but Foster found that he could dose 176 hogs in an 8-hour day, the animals ranging in size from young pigs to large boars and brood sows. We dosed pigs by pulling the jaws apart with two loops of heavy wire or rope. Another method which is used is to put one end of a short piece of old rubber garden hose in the pig's mouth and pour the dose through the hose as the pig chews on it.

While on this topic of dosing pigs, the writer would like to again express the idea that mineral mixtures and stock tonics are inadequate and unsatisfactory substitutes for anthelmintic treatment. Experiments by Foster and myself in the Bureau of Animal Industry convinced us that mixtures of charcoal, lime, ashes, iron sulphate and such ingredients were of no value in removing worms or preventing worm infestation in swine, but the Bureau did not see fit to publish our conclusions. The reason which was given me for this was that these mineral mixtures were valuable in the bodily economy of the pig and that if the farmer learned that they did not remove worms he might quit using them. This reasoning did not appeal to me at the time and does not appeal to me at this time. If a farmer wishes to feed

mineral mixtures for the value of the mineral food content, he should do so, but he should not invest time or money in such mixtures for the purpose of clearing out or preventing worm infestations. If he does, he allows his pigs to remain wormy when they should be relieved from worms and puts money into something he may not need or want.

In the same category as the mineral mixture are most of the so-called stock tonics. Of these products, the Michigan Dairy and Food Department says:

"In recent years agricultural papers have been filled with advertisements of various stock tonics. * * * Wherever careful experimental trials have been made under expert and disinterested supervision * * * the outcome has invariably been that the use of condimental feeds as feeds was problematical and without material effect on production."

The products are about as ineffective in controlling worms. I fed one of the best known stock tonics to a 10-kilo dog, giving 14 doses in 16 days, using the dose for a 500-pound hog. In that period the dog passed 17 per cent of its ascarids and no *Dipylidium*. At the same rate it would have required 3 months to free the dog of its ascarids. Had it been given in food, as it was supposed to be, it would have been much less effective. Another well-known stock tonic was fed to a 10-kilo dog daily in the dose for a 100-pound hog. As this tonic is 95 per cent common table salt, the dog was unable to keep it down, so after 3 days' vomiting the dose was cut in half, and given daily for 14 days. No worms were passed, and the treatment was a failure. Another tonic for hogs was given to a 14.5-kilo dog, in the dose for a 50- to 75-pound pig, giving 27 doses in 32 days, or double the number said to be necessary. This treatment was 6 per cent effective against ascarids and removed no *Taenia*. To be sure, a dog is not a hog, but the evidence as to anthelmintic ineffectiveness is none the less relevent.

Stock tonics must be safe for general use. Anthelmintics are not safe for general use, as a rule, if they are potent. Hence, stock tonics seldom contain the amounts of potent anthelmintics necessary to accomplish much.

The writer has been testing anthelmintics on dogs for three years and has made tests on 400 dogs. As a result of this work, certain anthelmintics for dogs have been rather firmly established as satisfactory.

The dog ascarids may be easily eliminated by the use of oil of chenopodium administered in a single dose of 0.1 mil per kilo of weight of dog. The oil may be given without enclosing it in a capsule, but this causes a lot of salivation, a very tenacious saliva when the chenopodium is accompanied by castor oil, which is the way it should be given. Hard capsules may be used for the oil or the soft, elastic capsule. In my experimental work, I have found the soft capsule entirely satisfactory and prefer it to other forms of administering the drug. I use the dosage given by Hall (1917) when administering the soft capsules, namely, 5 minims to dogs weighing 10 pounds or less; 10 minims to dogs weighing 10 to 20 pounds; 15 minims to dogs weighing 20 to 30 pounds; not to exceed 20 minims to dogs weighing over 30 pounds; and for toy dogs, cut the dose to 2 or 3 minims. Give an ounce of castor oil to dogs other than toys, and give toys a half ounce; give the castor oil immediately after the chenopodium. This is important. Chenopodium is toxic, constipating and a gastro-intestinal irritant. Castor oil slows absorption and distributes it over a larger surface of the gastro-intestinal mucosa, and it promotes elimination. Dogs can be given double the minimum lethal dose of oil of chenopodium with castor oil and will survive, as Hall (1918) has already noted. If dogs show symptoms of poisoning, which is not apt to be the case when castor oil is given with the chenopodium, give more castor oil. The following are contraindications for oil of chenopodium—severe acute or chronic nephritis, organic heart trouble of certain types, marked cachexia, severe gastro-enteritis, and severe infectious diseases, especially distemper. Nephritis is extremely common in dogs, as we know from such work as that of Meyer (1911) and as our postmortem examinations constantly show. Normal kidneys are scarce, even in young dogs. Meyer notes that Siebel suggested that this condition was probably a sequel to distemper, that disease which seems always and everywhere present among dogs. The large amount of meat in a dog's diet may predispose to nephritis. Ordinarily, dogs with the customary chronic nephritis tolerate oil of chenopodium very well, but I have had one or two deaths among my dogs that I thought were due to the action of a therapeutic dose of chenopodium in causing an intensification of an already severe nephritis. Ziegler (1917) regards death from a lethal dose as due to acute nephritis; personally, I believe death is due to a combination of nephritis, gastro-enteritis and heart depression.

Organic heart trouble in dogs is rarely recognized or even looked for, and I have seen no cases where I could attribute the death of an animal to the presence of such a condition, but the fact that chenopodium acts terminally as a heart depressant indicates the danger in this quarter.

Cachexia in dogs is apt to be an accompaniment of parasitism, but it is a condition that calls for caution in the use of an anthelmintic. I have had a number of deaths occur from the use of therapeutic doses of chenopodium and other drugs in cachectic animals. Such animals should be put on a nourishing diet before treatment, but if it is necessary to administer anthelmintics immediately, use one which is not a gastro-intestinal irritant, if possible. For this purpose santonin is to be recommended. Santonin is not a drug which gives good results in single-dose treatments. Even when in large doses, and I have used such doses as a half-grain for every pound of weight of dog, santonin cannot be depended on to remove all the worms present. The correct way to use santonin, so far as tests indicate, is to give small doses daily for a number of days, then suspend treatment for a few days and repeat if necessary. I find experimentally that such treatment can be depended on to remove ascarids without setting up gastro-intestinal irritation. So far I have found santonin a very safe drug when given with an equal amount of calomel, and I have yet to see the first fatality from this combination. I gave one dog 61 grains of santonin and an equal amount of calomel in this way in 90 days; the animal lost some weight and lost hair around the eyes, neck, the axillæ and inguinal region and along the abdomen, but seemed in good health otherwise. Another dog was given 50½ grains in 18 days.

Gastro-enteritis is a contraindication for the use of oil of chenopodium for the reason that the oil is a gastro-intestinal irritant. It is a condition that occasionally complicates distemper.

Dogs suffering from distemper should not be given oil of chenopodium. The bacterial infection overburdens the kidneys and heart, frequently occasions gastro-enteritis, and leads in many cases to cachexia. Such animals do not tolerate anthelmintic treatment.

For the removal of whipworms from the dog, santonin is the best drug of which I am aware. It should be given, as noted by Hall (1917), in doses of a grain a day with an equal amount of calomel. I think it is safest to give it for a week, then suspend

treatment for a week, then repeat as often as necessary. Some experiments along this line are given here:

Dog No. 110, a mongrel, weighing 13.6 kilos, was given a grain of santonin and an equal amount of calomel daily for a total of 6 grains in 8 days. The dog passed no worms and was found to have 2 whipworms on postmortem examination. The treatment was a failure, evidently due to not being persisted in.

Dog No. 111, a terrier, weighing 10 kilos, was given the same treatment for a total of 6 grains of santonin and of calomel in 8 days. The dog passed 29 ascarids the second day of the treatment, 2 the third, 1 the fourth, and 1 the seventh. On postmortem it had 1 ascarid and 1 whipworm. It will be noted that 1 ascarid did not come away until the seventh day and that another was still present postmortem. Had the treatment been persisted in, it would have removed the other ascarid, probably in a day or two, and the whipworms in time.

Dog No. 108, a mongrel, weighing 9.5 kilos, was given santonin and calomel 1 grain each daily for a total of 12 grains of each in 15 days. The third day of treatment the dog passed the posterior portion of a whipworm and the fourth day the anterior portion. On postmortem the animal was free from worms.

Dog No. 71, a spaniel mongrel, weighing 12 kilos, was given 1 grain each of santonin and calomel for a total of 61 grains in 90 days. The ninth day of treatment the dog passed 1 whipworm. Postmortem the dog had 32 hookworms and 4 *Dipylidium;* this confirms the dictum that santonin is of no value against hookworms and also indicates its lack of tæniacidal value, so far as *Dipylidium* is concerned. The dog lost a lot of hair, as already noted above, and had sores around its nose, but it was very active at all times.

Dog No. 120, a mongrel, weighing 13.5 kilos, was given 5 grains each of santonin and calomel daily for 5 days, and then the dose lessened, on account of the persistent vomiting, to 2½, 3 and 3½ grains daily for a total of 50½ grains in 18 days. On the fourth day of treatment the dog passed 14 whipworms. Postmortem the dog was free from worms. This experiment and the preceding show the tolerance of the dog for santonin, when given with calomel, and also the need for persistent treatment in order to remove whipworms.

The most serious of the intestinal parasites of dogs is the hookworm. Hall and Foster (1918) found that chloroform at the rate of 0.2 mil per kilo, mixed with an ounce or so of castor

oil, had an efficacy of 57 per cent against hookworm; oil of chenopodium at the rate of 0.1 to 0.3 mil per kilo, followed immediately by an ounce or so of castor oil, or given with castor oil, had an efficacy of 32 per cent, and thymol and calomel, in doses of 0.298 to 1.752 gm., had an efficacy of 15 per cent. In further tests of chloroform in our laboratory at Detroit, I have been unable to obtain as high efficacy as was obtained in the work at Washington. However, I have found that healthy dogs have a considerable tolerance for chloroform, surviving doses, not only of 0.2, 0.3 and 0.4 mil per kilo, but also of 0.666 mil, 1.0 mil and 2.0 mils per kilo. I have been told by a physician that he has given chloroform in doses of a half ounce to an ounce to patients. Alessandrini only uses 3-4 grams for man. The oral administration of chloroform produces an acute yellow necrosis of the liver, and this same condition is present and responsible for death in delayed chloroform poisoning from anesthesia. The condition has been studied and described by Whipple and Sperry (1909). If the patient survives, the necrosis clears up in from 10 days to 3 weeks, leaving a practically normal liver. One of the Detroit dogs, No. 88, a collie mongrel, weighing15 kilos, was given by stomach tube 30 mils of chloroform, a dose rate of 2 mils per kilo, in 40 mils of castor oil. Soon after dosing, the dog lay down, but was up and around in an hour and showed no symptoms. An hour and a half after dosing, the dog vomited, and then lay down for a half hour. After that the dog looked and acted entirely normal. Twenty-one days after this treatment the dog had a litter of 7 pups, and at least one of these pups was alive and well 4 months later. Fifty-five days after the chloroform was administered this dog was put in a chloroform box with 4 other dogs. The other dogs died inside of an hour. This dog survived the same atmosphere for almost 7 hours and then appeared to be coming out of the anesthesia; more chloroform was added and the dog presently succumbed.

Attempts to remove hookworms with single doses of oil of chenopodium did not meet with a high degree of success. The repeated administration of small doses, 2-5 minims daily for several days, gave good results, but apparently occasioned some little gastro-intestinal irritation. The method most used at present in the removal of hookworms from man, the administration of 3 doses at hour intervals, gave the best results. Some tests of this mode of treatment were as follows:

Dog No. 289, a hound, weighing 21 kilos, was given 3 doses, each dose consisting of a 10-minim soluble elastic capsule of oil of chenopodium, followed immediately by 15 mils of castor oil, at hour intervals, the last dose being followed an hour and a half later by 4 mils of chloroform in 15 mils of castor oil. The following day the dog passed 61 hookworms and 5 ascarids. The animal was killed the fourth day and found to have 10 hookworms. The treatment was therefore 86 per cent effective against hookworms and 100 per cent effective against ascarids.

Dog No. 301, a spaniel mongrel, weighing 15 kilos, was given the same treatment, except that no castor oil was given with each dose of chenopodium and the chloroform was given an hour after the last one in 30 mils of castor oil. The day after treatment the dog passed 33 hookworms and 1 ascarid. The third day after treatment the dog was found dead. One hookworm was found postmortem. The treatment was therefore 97 per cent effective against hookworms and 100 per cent effective against ascarids. This dog was in a late stage of distemper and anthelmintic treatment was contraindicated. Nursing would probably have saved the animal; the anthelmintic hastened death.

Dog No. 300, a wolfhound mongrel, weighing 18 kilos, was given 3 doses, each dose consisting of a 5-minim soluble elastic capsule of oil of chenopodium, at hour intervals, followed an hour later by 4 mils of chloroform in 30 mils of castor oil. The next day the dog passed 3 hookworms. The animal was killed the fourth day after treatment and found to have 3 hookworms, 1 *Physaloptera,* and 15 *Dipylidium.* The treatment was therefore 50 per cent effective against hookworms and 0 per cent effective against *Physaloptera* and *Dipylidium.*

Dog No. 292, a hound, weighing 14.5 kilos, was given the same treatment as Dog No. 300, except that each 5-minim capsule was accompanied by 15 mils of castor oil. The following day the dog passed 23 hookworms and the second day 7 hookworms. The animal was killed the fourth day and found to have 1 hookworm and 2 *Taenia pisiformis.* The treatment was therefore 97 per cent effective against hookworms and 0 per cent effective against *Taenia.*

Dog No. 293, a collie mongrel, weighing 12 kilos, was given 3 doses, each dose consisting of a 10-minim soluble elastic capsule of oil of chenopodium, at hour intervals, the last dose followed an hour later by 15 gm. Epsom salts in simple syrup. The next day the dog passed 2 hookworms and the second day 2 more

hookworms. The animal was killed on the fourth day and found free from parasites. The treatment was therefore 100 per cent effective against hookworms.

Dog No. 294, a collie, weighing 19 kilos, was given the same amount of chenopodium in the same way, but the Epsom salts were omitted and one-third of a grain of cascarin was given with the first and third doses of chenopodium. Two days later the dog passed 2 hookworms and 1 whipworm and 4 days later passed 1 more hookworm. The animal was killed the fourth day and found to have 1 hookworm, 21 whipworms, and 6 *Taenia pisiformis*. The treatment was therefore 75 per cent effective against hookworms, 5 per cent effective against whipworms and 0 per cent effective against *Taenia*.

Dog No. 299, a mastiff mongrel, weighing 15 kilos, was given 3 doses of 19 minims of oil of chenopodium in soluble elastic capsules at hour intervals, each dose being followed by the feeding of uncooked meat, to ascertain the effect of the presence of food on the efficacy of the anthelmintic. The day following treatment the dog passed 3 hookworms and 5 ascarids. The dog was killed the fourth day and found to have 5 hookworms. The treatment was therefore 37.5 per cent effective against hookworms and 100 per cent effective against ascarids. The presence of food lessened the efficacy of the anthelmintic, as would be expected.

Dog No. 309, a foxhound, weighing 14 kilos, was given 3 doses of 10 minims of oil of chenopodium in soluble elastic capsules at half-hour intervals, followed a half hour after the last dose by 30 mils of castor oil. After this treatment the dog broke out of its cage and got some meat. It passed no worms and was killed the fifth day after treatment. Postmortem there were 2 hookworms and 6 whipworms. The treatment was therefore 0 per cent effective against hookworms and whipworms.

Summarizing the foregoing, it appears that very high efficacy against hookworms in the dog may be expected from the use of oil of chenopodium in 3 doses of 10 minims each for average-sized animals or larger ones and of 5 minims each for smaller animals. Even the latter dose is too large for toys, and should be cut down according to the size and condition of the animal. The chenopodium seems to be quite effective whether given alone or with 15 mils of castor oil to each dose. I prefer to give the castor oil, as I believe it adds to the safety of the animal very materially. The hour interval seems to give more efficiency than

the half-hour interval. Some purgative should be given not later than an hour after the last dose of chenopodium. I prefer the soluble elastic capsule to other forms of administration of the chenopodium for dogs. It is convenient and effective, so far as dozens of tests on dogs show. The addition of chloroform to a final dose of castor oil probably aids in removing additional worms.

Treatment for hookworm in dogs calls for considerable judgment. Such animals already have an irritated intestine due to hookworm petechiæ, and, if clinical cases of uncinariasis or kennel anemia, are weak, emaciated and anemic. It is easy to kill such dogs by anthelmintic treatment. Hookworms are difficult to remove and call for larger doses of drugs than do ascarids. They will not respond to such drugs as santonin, which are non-irritant, and they require the use of such drugs as chenopodium, chloroform or thymol, all of which act more or less as gastro-intestinal irritants. Under these conditions, it may often be advisable to combine nursing treatment with repeated treatments by small doses of anthelmintic at intervals of 2 weeks or so, until the removal of part of the worms and the nursing put the animal in shape to endure the relatively drastic treatment necessary to clean out the infestation.

The worms which are of commonest occurrence in cats are the ascarids. These set up substantially the same chain of symptoms in cats as in dogs, except that the high-strung nervous system of the cat prediposes it to certain nervous disorders, and cats infested with worms are frequently subject to "fits." The treatment I have used and found successful for removing these worms is to give the cat a half-ounce of castor oil and then stick a pin in a 5-minim soluble elastic capsule of oil of chenopodium and squire from 2 to 4 minims of the oil against the roof of the mouth, or against the tongue. This is safe and effective. One must use these small doses in treating cats in order to be on the safe side, as they are twice as susceptible to poisoning from chenopodium as are dogs, the minimum lethal dose per kilo being only half as large.

The common nematodes of poultry are the heterakids, including the large *Ascaridia* of the small intestine and the small *Heterakis* of the cecum. I have nothing to add here to the findings reported by Hall and Foster (1918), who found an efficacy against *Ascaridia* of 76 per cent for turpentine in 2-mil doses, mixed with an equal amount of olive oil and followed immedi-

ately by 8 mils of castor oil, and an efficacy of 69 per cent for oil of chenopodium in a dose of 0.2 mil mixed with 2 mils of castor oil and preceded by 2 mils of castor oil, and an efficacy against *Heterakis* of 19 per cent for chopped tobacco stems soaked in water and mixed with feed.

A consideration of the foregoing shows that in the present state of our knowledge our best anthelmintics for certain purposes are oil of chenopodium, which is perhaps the most valuable anthelmintic known, santonin, valuable where repeated doses are desired and gastro-intestinal irritation must be avoided, turpentine, which acts in some respects like a weaker oil of chenopodium, copper sulphate, valuable in the ruminants, where its emetic action is not manifested, and tobacco, which seems to be adapted to the peculiar task of removing heterakids from the ceca of poultry.

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PRACTICAL METHODS OF PROPHYLAXIS AGAINST WORM INFESTATIONS.*

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The development of methods of prophylaxis is a highly important branch of parasitology, and is one of the great practical objects toward which the investigations carried on by parasitologists are directed. In the formulation of practical methods it is essential to know not only that certain results will be obtained, but also why they are obtained. Accordingly, practical methods of prophylaxis against worm infestations can only be considered to have a solid foundation when they are based upon a knowledge of the parasites involved, and on this account knowledge of the life histories and behavior of parasites is of great practical importance. Methods of control must be adjusted to peculiarities in the biology of the parasites concerned. Furthermore, not only may it be necessary to vary our methods for different species of parasites, but it is often necessary to use various methods for the same species according to locality, host animal affected, season of the year, and other conditions. A comprehensive discussion of methods of prophylaxis against parasitic worms infesting live stock would necessarily extend to a great length, as about 100 species each of tapeworms and flukes, and at least 250 species of roundworms parasitic in domestic animals are known to science. Obviously, within the proper limits of the present paper, it would be out of the question to take into consideration all of these parasites, and even though the great majority can be passed over, either because we have too little knowledge of their life histories or because their economic importance is relatively slight, the number remaining is still too great to be adequately treated in a short paper.

Consequently, rather than to attempt a discussion of any considerable number of the parasitic worms affecting live stock, it has seemed desirable to direct attention more particularly to a few of the forms that I have had under investigation at various times. These forms are used as examples of the practical importance of knowledge of life histories not because they provide better illustrations than others but because I have had a more direct interest in them.

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The manner in which I have treated the subject assigned to me may inspire the criticism not only that I have fallen short of what might have been reasonably expected from the title but that within the scope to which I have limited my paper it contains very little that is really practical. The material presented, however, I believe has a distinct practical value in its bearing on the question of prophylaxis against parasitic worms and therefore I trust its presentation under the title borne by this paper may be accepted as not altogether inappropriate.

Certain granulomatous growths and so-called summer sores on the skin of horses are infested with nematodes. These nematodes are larval forms whose identity until recently was entirely unknown. Thanks to the work of Descazeaux in South America, Railliet in Europe, Van Saceghem in Africa, and Bull in Australia, it is now evident that these worms are the larvæ of one or more species of *Habronema*. Two species of *Habronema* are known which live as adults in the stomach of the horse. Prior to the work of the investigators just mentioned I proved in the case of one of these species *(Habronema muscae)* that the common house fly acts as the intermediate host. The maggots of the fly developing in manure from horses harboring the adult worms become infected with the parasite, probably as a result of swallowing the eggs or embryos which are contained in the feces of infested horses. It is also possible but perhaps less likely that the embryonic worms after hatching actively penetrate into the bodies of the fly maggots. In the fly maggots they undergo considerable growth and development. At about the time the mature fly emerges from the pupa or resting stage that follows the active maggot stage the worms have completed their development so far as they are capable of doing in the fly. Horses while eating frequently swallow flies and the mouths of horses commonly are very attractive to flies. It is therefore natural to suppose that the young parasites in the flies reach the stomach of the horse as a result of the horse's swallowing infested flies. I have in fact found in a horse's stomach all stages in the growth of the parasite from the latest stage found in the fly up to the full-grown adult worm, and there is little doubt that many *Habronema* larvæ reach the stomach of their host as a result of the swallowing of infested flies or fly pupæ. Fly pupæ are often very numerous amid the chaff in the bottom of hay mangers and are not infrequently swallowed by horses. In the published report of my investigations on *Habronema,* with reference to the fact that the

fly's proboscis is a favorite location of the larval worms, it was suggested that they may abandon their intermediate host in some such manner as *Filaria* larvæ abandon the mosquito, and it was stated that, although no evidence of such an occurrence had been obtained, it is conceivable that the larvæ might escape from the fly through a slight rupture of the proboscis occurring at a moment when the fly was sucking moisture from the mucous membrane of a horse's lips, after which they could readily reach their final location, the stomach. It would seem in the light of the researches of Bull, Van Saceghem, Descazeaux and Railliet that the presence of *Habronema* larvæ in summer sores is to be similarly explained; that is, they are probably introduced by flies while sucking moisture from wounds or perhaps even from the uninjured skin. It remains to be determined whether the worms in summer sores ultimately die in the skin or other tissues into which they may migrate, without undergoing further development, or whether they finally reach the stomach in a roundabout manner like certain parasites of the alimentary tract and other internal organs that are known to enter the body not only through the mouth but also through the skin. The case of *Habronema* is a rather good illustration of the practical importance of knowledge concerning the life history of parasites. Though our knowledge in this case is still incomplete, it is clearly valuable as a basis upon which to work in devising measures of prophylaxis. Without this knowledge there would be very little chance of hitting upon a successful scheme of avoiding *Habronema* infection, but with the practical certainty that certain worms are responsible for summer sores, and that these worms are transmitted to horses by flies which in turn acquire the parasites as a result of breeding in manure from horses harboring the adult worms in their stomachs, it is quite possible that at least one solution of the summer sore problem may be reached by a solution of the problem of eradicating the flies that breed in horse manure.

A few years ago it was discovered that sheep in this country were commonly infested with tapeworm cysts in the muscles corresponding in all respects to those which the Germans had found occasionally in sheep and which they had taken for the larvæ of *Taenia solium.* An idea of the frequency of these parasites may be gained from the fact that nearly 40,000 sheep carcasses have been retained by United States meat inspectors in a single year on account of infestation with muscle cysticerci. In

other words, one sheep out of about every 300 slaughtered showed infestation with these parasites in sufficient degree to be caught by the inspector. As cysticerci located in the muscles are often hard to detect, it is, of course, certain that many cases escape even the careful inspection given by our Federal inspectors, so that the actual frequency of the parasites is undoubtedly greater than that indicated. Most of the cases found are slight cases and would be passed for sterilization under the regulations applying to tapeworm cysts in hogs, but nevertheless no small loss in our meat supply would occur if it were necessary to subject all the sheep carcasses found affected with tapeworm cysts to sterilization. Investigation of the sheep cysts was made and by careful study and experiments it was conclusively demonstrated that instead of being the larvæ of a rather dangerous tapeworm of man, as formerly supposed, they were not forms transmissible to human beings but belonged to a previous unrecognized species of tapeworm of the dog *(Taenia ovis)*. With this knowledge it was possible to handle sheep carcasses affected with tapeworm cysts under a different rule of meat inspection, namely, the rule applying to cases of infestation with parasites not transmissible to man. This rule provides that carcasses need to be condemned or passed for sterilization only in cases of heavy infestation or in cases in which the parasites can not be removed by trimming. Carcasses found to be lightly infested are eligible for food purposes after the removal of the parasites. This discussion of a matter of meat inspection strays somewhat from my subject, but the rectification of an important meat inspection regulation was not the only result of the investigation of the sheep cyst question as it demonstrated how the spread of the parasite might be prevented. It is this result that is of special interest in the present connection. A scheme of prophylaxis based upon the assumption that sheep acquired their infection from swallowing the eggs of a tapeworm of man would necessarily fail. The truth of the matter having been established, however, upon a basis of conclusive experiments, it is evident that the proper prophylactic measures against the mutton cysticercus are to destroy unnecessary dogs, to burn or bury the carcasses of sheep or otherwise dispose of them so that they can not be eaten by dogs, to feed no uncooked mutton to dogs, and further to insure the freedom of dogs from tapeworms by periodical anthelmintic treatment. In short, practically the same measures apply as in the case of the gid parasite

and the echinococcus parasite, whose adult stages are likewise tapeworms of the dog.

Very often the problem of controlling parasites whose life histories are complicated by the necessity for intermediate hosts such as the two parasites just discussed is simpler than the problem of controlling a parasite with a direct life history. For example, it is a very difficult matter to prevent the spread of the common intestinal round worm of hogs, *Ascaris suum* or *Ascaris lumbricoides*. This parasite has a direct life history inasmuch as it is transferred from one hog to another through the medium of microscopic eggs passed in the feces of one hog and swallowed by another. Recently Major Stewart of the Indian Medical Service has made the remarkable discovery that if the eggs of *Ascaris* are fed to rats and mice they hatch out in the intestine and the embryos migrate to the liver and other organs, including the lungs, meanwhile undergoing considerable growth and development. From the lungs the larvæ migrate up the trachea, and may be recovered from the saliva. Having crawled up the trachea, they pass down the esophagus, through the stomach and into the intestine. They remain for a time in the cecum, but finally leave the body in the feces. About two weeks are required for these migrations. Stewart failed to infect pigs by feeding them *Ascaris* eggs, and was led to conclude that rats and mice act as intermediate hosts. According to his view, the transfer of the larvæ to hogs or human beings is brought about through the contamination of food or water by the saliva or feces of infested rats or mice during the time the parasites are present in the mouth or intestine of these animals. Mr. Foster and I have repeated Stewart's experiments with results very similar to his, but have determined some additional facts, and have demonstrated that the parasite has a direct life history, so that our conclusions are at variance with those expressed by Stewart. Omitting a discussion of the details of our experiments, I may say that we have conclusively proved that pigs become infected with *Ascaris* as a result of swallowing the eggs of the parasite. After hatching, the larvæ undergo the same migrations as they do in rats and mice, with the difference that when they reach the pig's intestine after passing through the lungs they settle down and slowly develop into adult worms. In rabbits and guinea pigs, on the other hand, we have found that the larvæ, as in rats and mice, are unable to continue their development in the intestine. The incomplete development of *Ascaris* larvæ in various animals

shows that they are able to adapt themselves to a transient existence in strange hosts, but affords no evidence that these animals act under any circumstances as intermediate hosts. Stewart observed that rats or mice are very liable to die from pneumonia in cases of heavy invasions of the lungs by migrating *Ascaris* larvæ, and this fact was also noted in our experiments on rats, mice, guinea pigs, and rabbits. We have further found that pneumonia is liable to occur in pigs at the time the larvæ invade the lungs, and this pneumonia in pigs as well as in the smaller laboratory animals may result fatally. It seems not improbable that future investigations will show that infection with *Ascaris* and closely related parasites is responsible for some of the obscure lung troubles in pigs, children and other young animals.

Ascaris is harbored by a high percentage of hogs in all parts of the world. Though it appears to be most common in pigs less than a year old, it is of rather frequent occurrence in older animals. The eggs are present in the feces of infested animals in large numbers and in course of time the soil of places occupied by hogs becomes heavily laden with them. In the case of many species of parasites the eggs or the larvæ that hatch from them do not survive more than a few months. *Ascaris* eggs, however, are endowed with remarkable vitality and have been kept alive for as long as five years. They can survive for some time in a dry condition, and their shells are very impermeable, so that they are not affected by ordinary disinfectants. As an indication of the impermeability of the shells, it may be noted that formaldehyde solution makes an excellent medium in which to incubate the eggs in studying the embryonic development of the parasite. Taking into consideration such facts as these and considering also that the hog lives in particularly close relation with the soil, it is clear that the problem of preventing infection with *Ascaris* is not an easy one.

Notwithstanding the evident difficulty of the problem, however, there is one line of attack against the parasite which appears promising, and may lead to good results in reducing the damage done by it. Evidence is available which indicates that as hogs grow older they are not only less liable to injury by *Ascaris* but are also less susceptible to infection. It may be assumed therefore that the protection of very young pigs is particularly important. Evidently a fertile source of infection in the case of the suckling pig is the teats of the sow, soiled as they commonly are with the dirt of the pig pen. Such dirt is liable to contain many

Ascaris eggs, so that when the pig suckles it swallows not only its mother's milk but also very often *Ascaris* eggs in large or small numbers. Accordingly, it would seem that special care of the sow just before and during the suckling period with respect to cleanliness of herself and of the places in which she is kept is worthy of serious consideration as a prophylactic measure against *Ascaris* infection.

Another difficult parasite to manage is the stomach worm of sheep and other ruminants, the species of nematode known as *Haemonchus contortus.* Investigations which I made a number of years ago demonstrated the correctness of the belief previously held on theoretical grounds that this parasite has a direct life history, no intermediate host being necessary. The eggs of the stomach worm pass out of the bodies of infested animals in the feces. The larvæ which soon hatch from the eggs undergo certain developmental changes and in a few days in warm weather are ready to be swallowed by a sheep or other ruminant. After reaching the stomach of their host they complete their development to maturity in about three weeks. An interesting point that came out in these investigations was the fact that the larvæ when they reach the infectious stage crawl up blades of grass, thus getting into a position where they are more likely to be picked up by grazing animals than if they remained on or in the ground. Another important fact is the slight resistance of the eggs and newly hatched larvæ to freezing or drying. On the other hand, the larvæ that have reached the infectious stage are highly resistant to cold anl also to dryness, and consequently can live over the winter and also survive periods of drouth. Although the larvæ in the infectious stage are able to live many months, they ultimately die if they do not reach a suitable host. From knowledge thus far available it seems safe to assume that practically all infection in a pasture will die out within a year after the removal of sheep and other ruminants. Apparently also there is little residual infection in fields that have been plowed up and replanted. Just how long the adult parasites may live in an infested animal is uncertain, but they appear to be rather short lived, inasmuch as the number rapidly diminishes in animals that are removed from pasture, and placed in stables or dry yards. In such places the chances of reinfection are comparatively slight. Sheep, however, that were kept on frequently cleaned board floors still showed a few stomach worms at the end of about a year and a half, but it is believed that these resulted from re-

infection rather than they had survived in the sheep since their removal from pasture. After considerable experiment the conclusion has been reached that the only certain way of preventing infection among lambs is to take them away from the ewes at birth, feed them artificially on sterile milk, and keep them in clean pens and pastures, using scrupulous precautions to avoid the introduction of infection with contaminated feed, or water, or dirt carried on the feet of attendants. Obviously, such a rigorous method can not be applied practically. The plan of taking the lambs away from the ewes at birth, of course, would not be necessary if one could be sure that no worms were present among the ewes, but stomach worms are so common that there is no assurance that at least a few will not be present. Furthermore, medicinal treatment can not be depended upon to remove all stomach worms nor has it yet been found possible under practical conditions to protect the ewes from reinfection long enough for all the worms in their stomachs to die or disappear. In view of the practical impossibility therefore of entirely and with certainty ridding sheep of stomach worms, or of raising lambs altogether free from them, sheep must be considered always to be infected even though in slight degree, and the practical problem to be solved is to keep the number of worms down to a point where they will do no damage.

In work at the Bureau of Animal Industry farm near Vienna, Virginia, where study is being made of methods of handling sheep to avoid stomach worm trouble, successful results are being obtained by Doctor Cooper Curtice, who is in immediate charge of the work, in the following manner. During the autumn and winter the breeding ewes, the lambs of the spring crop and the yearlings are kept in separate flocks. The ewes are allowed to graze without reference to whether infection is present in the fields or pastures used. The lambs are kept, however, only in fields which have been plowed and planted with appropriate forage crops since their previous occupancy by sheep, and are changed to fresh fields as the grazing becomes exhausted. They may remain in one field for several weeks or months. This practice is continued throughout the following year, and they are similarly handled the autumn of the next year as yearlings, after which they are handled as breeding ewes. Beginning about May 15, the lambs and yearlings of the year before (now yearlings and two-year-olds respectively) are dosed once a month until September 15 with 50 to 100 c.c. of one per cent copper

sulphate solution, meanwhile being changed from time to time to fresh grazing as the forage crops develop. The lambs from the breeding flock are dropped in April. Until about June, when the first forage crops become available, the lambs are kept in the stable. The ewes are turned out daily on stubble fields or similar pasturage, being brought to the stable at noontime to allow the lambs to suckle, and are also kept with the latter in the stable at night. The manure is removed from the stable about once a week. About May 15 the ewes receive a dose of 100 c.c. of one per cent copper sulphate solution, and thereafter until September 15 are similarly dosed once a month. When the pasturage prepared for the lambs becomes available in June they are turned out daily and grazed between hurdles or portable fences, a fence in front and a fence behind, being moved to a fresh area every two to three weeks. At noontime they join the ewes in the stable, go back to pasture in the afternoon, and are kept with the ewes in the stable at night, so that they are with the latter during a period at noon and during the night, at other times being kept separate. Late in July or early in August the lambs are weaned and afterwards stabled and pastured entirely apart from the ewes. The two or three weeks' shifting of pasturage is continued until about the middle of August, when the lambs are turned into the corn field, and a month or so later they are placed on a field or fields which have been plowed and planted to a suitable forage crop at the proper time to be ready for them. After this the lambs are handled as yearlings. Under this method it will be noted the lambs receive no medicinal treatment, the treatment of the ewes, and the rotation of the pasturage being depended upon to prevent stomach worm trouble among the lambs. This method has also served to protect against trouble with other internal parasites as well as stomach worms. Complete freedom from stomach worms and other parasites has not been secured but the degree of infection has been exceedingly slight. The scheme outlined above may seem troublesome but it has not proved particularly difficult to follow. Further investigation may enable us to correct defects in this method, as well as to simplify it and make it more practicable, and we are encouraged in believing that we will finally be able to outline a definite scheme or schemes for handling sheep that can be depended upon to prevent losses from stomach worms and that at the same time will not be expensive or unduly troublesome.

Having in the foregoing briefly discussed a few special cases illustrating the usefulness of knowledge of the life history and behavior of parasitic worms in the development of practical methods of prophylaxis, I shall conclude by mentioning some rules or principles which have a more or less general application in the prevention of infestation with parasitic worms.

Wet land is usually very favorable to parasitic infestation. It should be drained or excluded from use as pasture.

Close-grazing, over-stocking, and long-continued use of the same pasture favor excessive parasitic infestation. Stock should be changed to fresh pasture as frequently as possible. The use of planted forage crops and the changing of stock from one field to another in regular rotation will help greatly to keep down infestation with parasitic worms to a minimum.

In general, the parasites of ruminants, horses and hogs are not inter-transmissible and these three classes of animals may be pastured in rotation on the same ground without danger (with some exceptions) of the passage of parasites from the animals of one class to those of another.

Live stock should be excluded from places where stable and barnyard manure is stored, and care should be taken that such places do not drain into pastures or paddocks or into water supplies. Exact data are lacking concerning the importance of manure as a source of parasitic infection when spread on fields after removal from piles or pits in which it has undergone more or less fermentation. The use of such manure on fields may not involve as much risk of spreading infection with parasitic worms as might be supposed, especially if the manure is plowed under after its application.

Animals suffering from infestation with parasitic worms will often show great improvement if they are removed from pasture and placed in yards free from vegetation, or in stables, provided these places are kept in a dry and cleanly condition by proper drainage and frequent removal of manure.

Well-fed animals are less likely to suffer from the effects of parasitic worms than those provided with insufficient food.

A clean water supply protected from fecal contamination is an important item among the general precautions to be taken against the infestation of live stock with parasitic worms.

Human excreta should be disposed of in such a way that there may be no contamination of feed, or water, or of places occupied by live stock.

All unnecessary dogs should be destroyed. Others should be kept free from tapeworms. Dead animals should be disposed of in such a manner as to prevent their being eaten by dogs. Dogs should not be fed raw mutton or uncooked offal of any kind.

[The discussion by Dr. Seymour Hadwen, of Ottawa, Canada, on Practical Methods of Treatment and Prophylaxis for Arthropod Infestations was not furnished the Journal for publication.]

THE CHAIRMAN: The symposium on parasitology is now open for general discussion. I know some of your have some questions to ask.

DISCUSSION.

DR. DALRYMPLE: A good many years ago, at the Louisiana Station, we made some experiments with parasites in sheep. The object at the time was to see if we could raise lambs from mothers infested with the *Œsophagostomum columbianum.* I think Dr. Ransom remembers those experiments because they were published in bulletin form at the time. In trying to get the lambs free from infestation from the mothers we erected a place with three compartments. One was at the end for the ewes, another at the other end for the lambs, and the middle one was the suckling pen. The object of that was to try to keep the lambs away from the mothers except at certain periods, which we called suckling periods, during the course of the day. Afterwards, I was convinced that the nodule worm really was not doing the harm that was supposed of it, but that the stomach worm was doing a heap more harm than the worm we were investigating at the time, because all the lambs afterwards had stomach worms. Then we started an investigation with the stomach worm, and this previous work, keeping the animals apart, suggested an arrangement there. First of all, we tried what we called the "dry-lot method," feeling that if we got the lots clear of grass and kept them that way there was a possibility of reducing the chances of infestation. That method led up to a suggestion of arranging an area, depending on the size of the flock of sheep, with one part for infested ewes and another part for the lambs, having between the two lots a ditch sufficient to carry off any infection that might be carried from the lot the ewes occupied onto the lot containing the lambs. We had a dog-proof fence around the whole thing to keep dogs away, and arranged this three-compartment shed so that we could keep the lambs abso-

lutely free from their mothers except during the suckling periods. Then the presumption was, we could raise sound lambs, or practically so, from diseased or infested mothers, and when they were ready to wean and place upon clean grazing provided for them, we could reduce the mortality, raise the lambs up to a marketable condition with as little infestation as possible. We at that time tried a great many agents. We experimented with gasoline, coal-tar creosote, and even with carbon bisulphide. I remember we tried giving it in milk, in oil, and as an emulsion. At that time we did not try sulphate of copper, but we had varied results from the other agents mentioned. Speaking about sulphate of copper, we have been recommending that agent a good deal, of late years, both for lambs and calves, using it in the strength that the South African people recommend, something like 16 ounces to 9½ gallons of water, in solution, giving so much of the solution according to the age of the animal. I have been recommending this in cases where the animals were pretty badly infested, to give two doses during one week, then skip a week, and give two doses the third week. During this time we had the lambs or calves kept in a dry place away from infection, and then, of course, put them onto a clean place after the treatment with sulphate of copper. This was not done under my own supervision, but merely by suggestion, and I believe with good results. I do not know whether that is the best method of giving this treatment, but it seemed to evidence good results when given in the manner described. Of course, as in many other sections of the country, we have large grazing areas, and it is difficult to treat individual animals on our immense cut-over pine lands in the South. They are magnificent grazing lands for both sheep and cattle, but we have to use treatment in a more wholesale way, rather than by a very intensive individual method.

I want a little information on the Armed Sclerostome, or what we used to call the *Strongylus armatus*. We hear from our practitioners in Louisiana a great deal about this parasite. The treatment, I think, which they have given has been that recommended in some works on parasitology, at some stages giving turpentine, and at others antimony tartrate. I believe, possibly on account of carelessness in connection with the water supply in that level section, there may be a good deal of infection of the shallow wells through seepage from infected feces, and which may be a continuing source of the trouble. However, it has increased to such

an alarming extent that I once thought of writing to you (Dr. Ransom).

Speaking about horse flies or tabanids, I recollect as far back as 1896 we made an investigation of a very serious outbreak of anthrax in the northern portion of our state. I do not remember just the different varieties present, but I think we referred to the most predominant at that time as the *Tabanus lineola,* which were in plague numbers. Even house windows were darkened by these flies, and when they were frightened from the backs of animals it was just like taking a sprinkling pot full of blood and sprinkling the animals' backs, the blood pouring from the punctures. In reporting the outbreak I remember we stated our belief that, on account of the speed with which the infection traveled, there must be some variety of insect to carry it so fast and spread it so widely; and that horse flies were in such tremendous numbers, there was no doubt in our minds that they were the responsible carriers of the infection from one animal to another. That we have since proven in our laboratory work by Dr. Morris, our bacteriologist and assistant veterinarian of the Station, who has been doing some excellent investigation work with carriers of anthrax infection. He has transmitted the disease from infected animals to sound animals by means of some of the blood-sucking insects, such as the horn fly, etc. While in the early days we did not think so much of insects as transmitters of disease, I was very much impressed with this probability, and made the statement at that time that some day it would be found that insects were very much more responsible for the transmission of diseases than was then thought. You know what it is today. So many diseases are now known to be transmitted, either directly or indirectly, through the medium of insect life. Is there anything you have that is later than the old treatment for the *Strongylus armatus,* Dr. Ransom?

Dr. Ransom: I think Dr. Dalrymple's question is answered in part by Dr. Hall's paper. I have done practically no work at all on the treatment of these horse parasites. Dr. Hall's paper is as new to me as it is to Dr. Dalrymple.

Dr. Dalrymple: I understand at a certain stage the worm is in the circulation and at another stage in the alimentary canal. It is a question of treatment during the different stages of the worm, I presume, if there is anything new.

Dr. Ransom: There are three species that have been commonly considered under the name of *Strongylus armatus.* There

is *Strongylus vulgaris,* which is a rather small species and which has its younger stages in the mesenteric arteries. It is that form which is believed by Looss and others to be the sole cause of verminous aneurism. Another form has its young stages in the pancreas, connective tissues between the liver and stomach, and in similar locations. The young stage of still another species is found in the subperitoneal connective tissue, particularly under the peritoneum on the right side of the body and also in the testicles of cryptorchids. Those three have each one some different habits with reference to the larval stages. The early history of these forms, so far as we know them, is very similar in each case, that is, the eggs pass out of the body in the feces and are spread about over the pastures and hatch very promptly. After a period of development, which probably requires only a few days, the larvæ reach what may be called the final larval stage, and in this stage, as in the case of the stomach worms of sheep, the larvæ climb up blades of grass and in that way get to points where they are more likely to be picked up by horses while grazing. It is on that account that more infection is acquired by horses on pasture than in stables.

Dr. Fitch: In relation to Dr. Hall's paper and the use of oil of chenopodium in the treatment of strongylidosis of horses, it seems to me rather strange that he could recommend oil of chenopodium as strongly as he did without taking into consideration the lesions which may exist in the blood vessels, in the peritoneum and in the other internal organs caused by this parasite. I do not know the action of the oil of chenopodium upon the larvæ of these parasites which exist in those places, but I am rather of opinion that there it has very little, if any, action. Is there any data on this question?

Dr. Ransom: Nothing new.

Dr. Fitch: It would seem to me then, even though you rid the intestinal tract of *Strongylus equinus, Strongylus edentatus* and *Strongylus vulgare,* nevertheless the larvæ of each are found in these other localities, you have opportunity for reinfection and possibly more pronounced lesions and more pronounced symptoms resulting from the lesions in the other localities. Certainly it would be a boon to certain sections of the United States, and particularly in Minnesota, if we could have some agent that would rid horses of those larvæ which enter the blood vessels. Aneurisms are common in certain districts in Minnesota. Again, in regard to the *Habronema* of which Dr. Ransom spoke, in all

the autopsies which I made at Cornell University on horses, I never found a specimen of *Habronema megastoma*. Dr. Crocker, who conducts the autopsies at the University of Pennsylvania, tells me that *Habronema megastoma* is a relatively common parasite. In the few autopsies which I have performed at the University of Minnesota we have found a number of *Habronema megastoma* and a few *Habronema microstoma*. *Habronema muscae* is transmitted by flies and there is a possibility of the others being transmitted in the same way. It seems strange that there should be this localization in the parasite, and I should like to ask Dr. Ransom if he has any explanation in regard to it. Further, I would like to ask if there is any explanation in regard to the relative inefficiency of the oil of chenopodium for the *Ascaris* of horses.

Dr. Ransom: With reference to Dr. Fitch's question concerning *Habronema*, no explanation occurs to me why it has failed to be present at Ithaca and is fairly common in St. Paul. Perhaps Dr. Fitch was not looking for it.

Dr. Fitch: We were.

Dr. Ransom: Perhaps the time of year had something to do with it, and climatic conditions may be an important factor.

Dr. Fitch: We performed autopsies as they came along and they occur at different times of the year.

Dr. Ransom: I have found *Habronema* in Colorado, Nebraska, Illinois and the District of Columbia.

Dr. Fitch: Have you ever found it in New York?

Dr. Ransom: I have never had an opportunity of examining horses in New York.

Dr. Fitch: Are there cases on record?

Dr. Ransom: No, not so far as I know.

Dr. Fitch: They probably occur.

Dr. Ransom: Yes. With reference to the other question about oil of chenopodium and *Ascaris*, I am just as much in the dark as Dr. Hall is as to why it should be so effective in the case of pigs and ineffective in the case of horses. The thought occurs to me that possibly, since Dr. Hall has referred to only relatively a few cases in which it was tried on horses, his failure to remove the parasites may have been more or less accidental. As with other remedies, it is important to have not only carefully controlled experimental evidence, but in addition a large mass of evidence derived from the practical use of the remedy before drawing a definite conclusion. The use of medicinal agents is

affected by so many conditions that one is hardly safe on the basis of a few experiments to draw a conclusion as to the efficacy and value of a drug. Accordingly, it seems to me we should not draw very definite conclusions as to the value, or lack of value, of any particular remedy for a certain parasite in a certain animal until a considerable mass of data is accumulated. This is a point which Dr. Hall emphasizes in the introduction of his highly interesting and important paper.

Dr. Hoskins: I was present at the autopsy of the first horse that Dr. Hall tried chenopodium on and a much more surprised man than Dr. Hall was, at the result of the autopsy and the failure of chenopodium, would be hard to find. He is going to keep at it, however, and has stated in his paper that he is unable to figure out why that particular drug should be so efficacious in other species and fall down so flatly in horses. He is going to keep on until he strikes the right combination. He is strongly of the opinion that some modification of the method of administering it will prove effective, either in repeated, graduated doses or in combination with something else, and it is his intention to continue the experiments. Of course, it means a horse every time he conducts an experiment, and it is rather a costly procedure. He usually has to wait until we have a horse for which we have no further use, and the work is carried on in that way.

Dr. Fitch: Did you notice whether the horse in the experiment had all the species of Strongyli or whether they were all *equinus*, and also whether there were any larvæ present?

Dr. Hoskins: I would not state positively on that point, although I believe he has found in many of his cases that there were representatives of all three species.

Dr. Connaway: Just a little matter of history connected with the relation of flies to anthrax that Dr. Dalrymple mentioned. I recall an outbreak of anthrax in Mississippi in the summer of 1889. Did you have the same trouble in Louisiana at that time?

Dr. Dalrymple: That was the year I went there.

Dr. Connaway: It was the summer of 1889. It was not very long after the Pasteur treatment had been discovered. There was a popular notion among planters there that a certain fly—I do not know just what particular fly it was—was associated with this disease. They applied ointments of various kinds to keep those flies off, so we see sometimes our science follows popular notions which give us good suggestions. The same, I think,

is true of the tick. Old Col. Dean, of the Bureau of Animal Industry, who was one of the old inspectors that had to deal with the tick in the early days, told me that the suggestion that the tick was a carrier of Texas fever came from the observation that cattle from certain districts were more ticky than other cattle from the South, and that those very ticky cattle were worse spreaders of this disease when they came on to our Northern pastures, so there was another popular notion that the tick was a carrier of disease that was proved later by scientific investigation.

A METHOD OF OPERATING SCROTAL HERNIA IN BOAR PIGS TO SAVE THE TESTICLE.*

H. S. MURPHEY, Ames, Iowa.

HISTORY.

Last spring a number of telephone calls and letters were received from a community asking regarding a method of operating boar pigs, with the idea of saving the testicle and using the animal for breeding purposes. We were told that a certain veterinarian, one of our recent graduates, was doing such an operation successfully. We referred the inquiring veterinarian to this veterinarian for information, and believed that we had extricated ourselves from a dilemma in a diplomatic manner, but soon both veterinarians went to the army and the owner of the pigs then began writing us. After some discussion, the clinic staff decided to attempt the operation if the owner would assume the risk. Accordingly, a letter was sent to the owner pointing out the dangers of the operation and the probabilities of failure. It was pointed out that the operation might not succeed on account of failure to close the hernial ring, that the contraction of scar tissue following the operation might result in sterilizing the animal, and that there was also a possibility that the animal would throw ruptured pigs, but in spite of this the owner sent us three pigs. Five were operated in June and July, 1918. In all of the operations the hernia was cured. Three of the pigs have made a complete recovery and are heading herds. One of them has not been used for breeding purposes, but is vigorous. The fifth would pay no attention to a sow in heat. He was castrated January 24, 1919. Extensive peritoneal adhesions were present

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on the operated side, but both testicles contained very large numbers of actively mobile spermatozoa. It is now evident that he lacked only the sexual appetite.

METHOD OF PROCEDURE.

First, shrink the animal for one or two days. If the abdomen seems to be very full it is advisable to give a physic. Second, administer 4 to 6 grams of chloralhydrate per 50 pounds weight, per rectum, after lavage. After 20 to 30 minutes the case is ready for operation. The pig is placed on his back with the hind parts elevated at an angle of 35 to 45 degrees. Rigid aseptic precautions are essential. The following instruments are necessary: scalpel, 3 or 4 hemostats, hernia clamp, catgut and a Peter's ligature needle, Carson's special curve ligature needle, two suturing needles, and silk or linen suturing material. Reduce the hernia by manipulation. A liberal incision over the external ring is made through the skin, fat and fascia, exposing the tunica vaginalis communis, and also the muscular wall of the abdomen in front of the ring. The tunica vaginalis communis with its contained spermatic cord is separated from the underlying tissue so that the whole of it may be palpated and grasped just posterior to the external inguinal ring. The handling should be done carefully in order not to set up irritation resulting in adhesions not wanted. If the hernia has not been reduced it should be at this time. There are very seldom adhesions in scrotal hernia, so that reduction is a comparatively simple process.

Locate the spermatic cord in the posterior part of the tunic. The ductus deferens, and the vessels can be palpated through the tunic without difficulty. Pick up the common tunic with the right hand while the left hand holds the spermatic cord posteriorly; have an assistant place the clamp longitudinally on the tunica vaginalis communis so that the canal will be obliterated both longitudinally and tranversely. Before the clamp is tightened draw the tunic downward out of the canal as far as possible without injuring the peritoneum, clamp tight and suture tunica vaginalis communis close to the clamp with catgut, using the lock stitch. Remove clamp and allow cord to return into inguinal canal. It is now advisable to push the spermatic cord downward and medially so that the anterior portion of the external ring may be sutured. Two or three strong retention sutures are put in here merely to hold the parts rigid until the inflammatory reaction will cause enough adhesions to keep the canal closed.

Touch edges of skin with tincture of iodine and suture, using Glover's stitch No. 2, also known as the whip stitch. Suture should be left in from 7 to 10 days, the animal forced to take some exercise, given light fluid or semi-fluid diet. The swelling, which is severe, but mostly edematous, due to shutting off of the outgoing lymph vessels through the inguinal canal, should be massaged daily.

My colleagues in the clinic, Drs. C. H. Covault and T. S. Leith, share the credit with me for the technique and execution of this operation.

CHOREA IN DOG (ST. VITUS' DANCE).

Oscar Schreck, New Haven, Conn.

Chorea in its generic signification includes such a wide range of nervous conditions, and has for its predisposing causes such a variety of pathological lesions that at times some confusion arises from the fact that under the name "Chorea" are included several forms of nervous diseases and wrong diagnosis and etiology is apt to be made. Chorea is a peculiar disorder, for the most part, of early life of the animal. It may, however, begin in adult life, and is essentially a functional disorder of the nervous centers. Characterized by disorderly movements, which in this instance are usually unilateral, but soon become general. The whole body of the animal is not usually affected until late in the disease, and the left side is usually more severely attacked than the right. But the animal is not deprived of consciousness, and with it has the power of all voluntary motion. It is not uncommon to meet with it at all seasons of the year. The impairment is the result of bacterial or chemical poisons upon the neurons, and probably a nervous predisposition plays a chief part. In general terms, Choreic movements of all kinds are primarily due to neuronic weakness or instability. Worms are believed by some to be a frequent exciting cause; also dentition, intestinal irritation, pregnancy, etc., and finally atmospheric conditions. Few cases in the animal that are the sequelæ of distemper ever wholly recover. The disease is also seen often in the spayed animal. Constipation, debility, etc., are also stated as causes.

SYMPTOMS.

Chorea generally comes on insidiously, and the onset is seldom well marked, and not infrequently before any convulsive move-

ments are recognized, with more or less general loss of health, and, as a rule, first the animal's disposition becomes irritable or moody, with impairment of the nutritive functions. Various prodromed symptoms of this disease are mentioned by the different authors, but the choreic movements are mostly first manifested upon one side, to one leg or shoulder, with a peculiar action and twitching of the eyelids, which the animal has no power to control, and any excitement is apt to intensify the muscular twitchings In the dog, usually the muscles of the head and neck are affected. The actions of the muscles of the head and neck are probably as incoherent as those of the face, due to alterations in the spinal cord, or to the disease of the facial nerve affecting the face only, so that the head is somewhat jerked to one side, and the muscles of the body partake at times of general convulsive movements, and deglutition at times rendered difficult. In the fully developed disease the symptoms vary in degree rather than kind, and there will also be found some impairment of the strength of the affected muscles of the animal, some paresis, a fact especially easy of recognition in cases of unilateral chorea. The animal's appetite is often affected and bowels confined. In some cases urine and feces are involuntarily discharged and the urea excreted is greatly increased. In the progress of the disease the eye loses its brightness and intelligence, and we often see a very marked irregularity in the breathing, awkwardness of movements in the extremities and difficult for the animal to stand still. The convulsions generally subside in some degree when the animal is lying down (if they are not very violent) ; they are, however, at times very severe just preceding repose. The animal may be able to restrain them for a few minutes, but they soon become aggravated again in a short time. This and the convulsive twitching movements of the face, ears, limbs, with erratic behavior of the voluntary muscles, when called into action, are characteristic of chorea.

The changes which exist in the brain or spinal cord in connection with this disease are unknown, and it is doubtful if any exist. All theories in relation to it are either pure assumptions or are based upon insufficient data. But we do know that the disease seems to exist in animals that have had isolated cases of hysteria or epilepsy among different branches of their family.

TREATMENT.

Chorea, or St. Vitus' Dance, is, as stated, a disease of the nervous system, which is most frequently seen in the young animal. It responds to treatment often, but it is by no means rare to meet cases which are persistent and will not yield to any remedial measures we can bring to bear, and in such, recovery is not certain. In the treatment we should, as far as possible, remove all sources of reflex irritation, or any existing cause, such as worms or anything which disturbs and annoys the animal; such does harm. If there is constipation it must be immediately removed. As Chorea in the dog and cat, in most cases, is allied closely with distemper, arsenic is the most favored remedy with some, when the Chorea is not dependent upon rheumatism. Arsenic will always maintain its place in the treatment of Chorea or of its many neuroses. There are times when the remedy fails and we are unable to tell under what circumstances the arsenic may be expected to be effective and when not, and, as it is not a local disease, but one in which motor disturbances are produced as a result of impairment of the nervous functions (reflex Chorea, however, should not be forgotten), the treatment may be divided into three parts. First, the removal of the cause; second, to stop the waste of nervous energy in the animal; and, third, to stimulate and build up the nutrition of the neuron bodies. This is a disease in which we might suppose the agents commonly called antispasmodics could be used with advantage, and experience has proven that, as auxiliaries, they may, and, in fact, are, frequently very valuable. As general remedies calculated to control spasms, however, they are very ineffective. It is impossible, therefore, that any one mode of treatment, or any particular set of remedies, can or do answer in all cases. Excellent results have been obtained by simple hygienic treatment, generous diet, and the animal kept as quiet as possible. As the cell bodies of the neurons must be supplied with nutrition, and as many animals will not take sufficient nourishment, to say nothing of an abundance of food which should be taken in this trouble, forced feeding should be resorted to if necessary, feeding often and in small quantities at a time. Raw eggs seem to work wonders in the treatment of this disease in the dog; in fact, all nervous troubles. (Two or three eggs are to be beaetn up with a tablespoonful of cold water and fed to the animal.) Fats play an important part in nervous nutrition and should form a great part of the food of the animal. As is well known in human

medicine, cod liver oil is highly spoken of, but in our patients fats of meats and milk are used. Raw eggs stirred in milk is a valuable food, because it contains a chemical compound which acts as a stimulant to cell metabolism. Scraped raw beef is easy of digestion, which is of the utmost importance in this disease. As excitement and bad hygienic rules are predisposing factors, supplying the animal with opposite conditions ought to, and, in fact, do, effect improvement. The remedies useful are the mineral tonic group, of which arsenic stands first; and still other agents are used by some. However, we cannot say that any drug or drugs does the greatest good; we can only give results of our own methods used in the treatment of this disease. Galvanization is also serviceable (not too strong); saline solution, when the bowels are confined; sodii salicylate, 2-7 grains, has been highly recommended; also antipyrin in 10-grain capsules, followed by the systematic employment of arsenic, if the disease does not respond to antipyrin. Exalgini, as recommended by Brumley, has given results in mild cases in my hands. But the best results will be derived from drugs given for the purpose of stimulating the cell bodies of the neurons to more active metabolism, so that they may take up the food supply brought to them. But the doses must be small, for there is danger of over-stimulation, which is detrimental to the animal. Nuclein and lecithin are also highly recommended by some, claiming the system should be furnished the constructive elements it lacks or in which it is deficient.

Below are given some useful prescriptions in the treatment of this disease which have been tried by the writer with more or less success:

℞ Tr. Gelsemii................ʒ ij
Stronii Iodi................
Stronii Bromi........aa....ʒ j
Elixir Pep. Lactat.....qs....℥ iij

Sig. Teaspoonful in a little water every two to six hours as required to control the symptoms.

℞ Monobromated Camphor.....gr. xlv
Ext. Quassiæ................gr. xxx
Ext. Belladonnæ............gr. iv
M. et. fiat pill No. XXX.
Sig. One pill t. i. d.

℞ Sol. Potassii Arsenitis.......ʒ ss
Syupi Ferri Iodii...........℥ j
Sig. 10 to 30 drops in water t. i. d., reducing and increasing dose, watching the effect of the drug.

℞ Liq. Potasii Arsenitis........ʒ j
Tinct. Ferri Mur............ʒ ij
Inf. Gentianæ...............℥ xiij
Sig. Teaspoonful t. i. d.

IMMUNIZATION PRODUCTS AND INDICATIONS FOR THEIR USE.*

CHARLES MURRAY, Ames, Iowa.

Immunity represents resistance to infection. If such resistance be the attribute of a race or species it constitutes a natural immunity; if it be attained through the activity of the body cells as a result of having had the disease, or as the result of inoculation with a modified or attenuated form of the causative factor, it is known as active acquired immunity. If the resistance to disease is due to defensive factors not originating in the individual protected, but to factors introduced by the injection of serum from another individual which has acquired an active immunity to the disease in question, it constitutes a passive acquired immunity.

The purpose of immunization is to increase any resistance already possessed by an individual. The nature of the disease determines the extent of such increase, and the nature of the disease depends, in turn, upon the infectious agent and the host. The remarkable success attending the immunization against some of the diseases first combatted by this method (smallpox, for example) has led to the belief that the same results may be obtained in all diseases. Pasteur's vaccination of cattle and sheep against anthrax in 1881 encouraged the belief that vaccination would be completely protective. In the early nineties, when von Behring discovered the antitoxin of diphtheria and demonstrated its efficacy in the treatment of that disease, and later when he and Kitasato produced an antitetanic serum and demonstrated its value in the treatment of tetanus it was felt by many that eventually immunizing agents would be found for

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all diseases and thereby they would be conquered. Unfortunately, such has not come about. The element of luck undoubtedly accompanied these pioneer efforts in that the diseases first selected for experimentation were most adaptable to illustrate the various processes of immunization in their most favorable aspects. At present we are forced to the conclusion that no kind of immunization will protect at all times and under all conditions. Individual resistance or susceptibility to the same infectious agent makes it impossible to bring all individuals to the same degree of immunity. All we have a right to expect is that we may reduce a fatal to a non-fatal infection, cause a mild one to be so modified as to be unrecognizable, or furnish complete protection. The degree of modification to which a microörganism is subjected in its preparation for injection determines in large measure the degree of protection afforded by an immunizing treatment. However slight the reaction following the administration of an agent to produce active acquired immunity, there is reason to believe that there is some increase of the virus, this increase being necessary to stimulate the body cells to the production of antibodies. The problem that confronts us is so to regulate this stimulation that the individual may suffer the least possible injury.

There is an all too prevalent idea today that the microörganism of any disease will, if properly introduced into a susceptible individual, stimulate within that individual an immunity to the disease of which the organism is the cause, also that the finding of an organism associated with any disease calls for the administration of some sort of product of this organism in order to combat the disease. From this erroneous idea we have thrust before us in the literature of many concerns the spectacle of what seems to be a contest to incorporate in a given vaccine or bacterin the greatest number possible of species of bacteria without their having been proven of etiological importance; in other words, the tendency seems to be to forget that immunity is highly specific and requires for its production the specific organism of the disease. The mere occurrence of an organism in the organs of an animal suffering from a disease is not prima facie evidence of its having any primary significance or, for that matter, any significance at all. To illustrate, the B. choleræ suis was once looked upon as the active agent of hog cholera, largely because of its so frequently being found in the organs of animals dead from this disease. The use of a bacterin prepared from this

organism had little if any effect in controlling hog cholera. When the true cause of hog cholera became known its use in the production of an immune substance gave practically complete control of the pure form of the disease. Secondary invaders, such as the B. choleræ suis, are generally suppressed by controlling the primary agents of disease. To incriminate an organism as the etiological factor in any disease requires that it meet the requirements of the so-called "Koch's postulates," which are:

1. The suspected organism must be found in all cases of the disease under consideration.

2. The organism must be isolated and grown in pure culture.

3. Inoculation of the organism into suitable animals should reproduce the disease.

4. The organism must be isolated from such animal.

With few exceptions the above rules will apply to most animal diseases. Hog cholera, in which the virus is ultra microscopic, is one of the exceptions, but, using the living animal as a culture medium, this, too, will answer satisfactorily the requirements of Koch. The relationship of an organism to a particular disease may also be established through serological tests.

There is a well-defined distinction between the various bacteria with regard to the immunity produced as the result of their introduction into an individual. The ones most satisfactory are those acting entirely through their toxins; e. g., the diphtheria and tetanus organisms. Next in the scale are those producing acute septicemia and which are easily destroyed, such as the bipolar organisms. Those which produce a chronic condition are least satisfactory, and of these the ones producing the chronic condition running the longest course are lowest in immunizing properties. Of all agents used in the stimulation and production of immunity the living virus is the most efficient. This is demonstrated in practice in the use of anthrax and plague (human) vaccine and in the laboratory animal particularly by the use of living bacteria as antigens for the production of agglutinins, etc. The reaction induced by the use of living virus is very much like that brought on by the natural disease. The main objections to its use are the danger from an insufficient attenuation or modification of virulence and the difficulty of preserving the live organisms in the form of vaccine for long periods. Very few living organisms can be used with safety except they have been given some degree of attenuation. Some which have a selective

action for certain tissues have been found safe to use when injected unattenuated in tissues for which they have little affinity. At the Pasteur institute at Paris it has been shown that the typhoid bacillus is unable to produce disease unless it be administered through the gastro-intestinal tract and that subcutaneous injections of fully virulent culture are made without ill effects.

In the earlier periods of work on immunization it was the hope that bacteria of a type closely related to the real etiological factor, but harmless, might be utilized to confer an immunity against their closely related type and the real cause of disease. But continued study showed the high degree of specificity of immunizing substances. The harmless colon bacillus, so closely related to many of the disease-producing organisms of the colon-typhoid group that mild serological inter-reactions may be demonstrated, it would seem should stimulate an immunity for the harmful types, but such is not the case. More and more light has been thrown on this specific property of antibody production and the number of recognized immunizing bacteria has steadily decreased. The restricted circle of immunizing bacteria is well illustrated in the present knowledge of immunity in pneumonia. The serum which protects against an infection of one group of pneumococcus has no protective value against another, although culturally and morphologically the different types are the same. The acquirement of this specific property by bacteria is undoubtedly the result of their accommodating themselves to their host, and when removed from the host and cultured on artificial media they rapidly lose the same.

Theobald Smith in a paper before the Congress of American Physicians and Surgeons at Washington in 1916 stated that "In spite of the various objections to the method of living vaccines it is the coming method; not, perhaps, in our day. The opportunities for improving and fixing the vaccinal value and safety of immunizing strains have not yet been exhausted and here, as in other directions of preventive work, we must look to the results obtained from animal pathology in its dealing with natural diseases to give us courage to proceed."

Dr. Philip B. Hadley of Rhode Island has in his work with fowl cholera demonstrated the possibility of the use of avirulent strains of microörganisms as immunizing agents against virulent ones. He isolated one strain of the B. avisepticus which proved harmless to fowls and rabbits, yet which injected into these animals rendered them highly immune to the most virulent

strains. Perhaps such strains will be found among organisms of other diseases.

Second to the living virus in the production of immunity is the organism killed by heat or antiseptics. The so-called bacterins for various diseases form an important adjunct to the practitioner's stock of therapeutic agents. But, again, the fact of their specific action must be borne in mind. To use a "shotgun" mixture of microörganisms in the preparation of a bacterin for the treatment of a disease merely because all are found associated with it and in the hope that one or more of them may perhaps be the ones responsible for the condition is too crude a procedure to merit the interest of the intelligent practitioner. As with living vaccines, so with dead cultures; some confer an immunity, others do not. Success with one does not guarantee success with another. Those organisms whose antigenic properties depend upon the presence of certain products, such as toxins or ferments, cannot be expected to act satisfactorily when killed because the production of these ceases when the life of the bacteria ceases and the content in the microörganism is not sufficient to raise the immunity level high enough to protect an individual from infection. The apparent success of immunization against hemorrhagic septicemia through the use of bacterins is most encouraging for this method of vaccination. A recent modification in the use of killed cultures is that of suspending bacteria before injection in an homologous immune serum (sensitized bacterins). These bacteria become saturated with immune bodies and in this condition quickly and with lessened reaction produce immunity. With certain types of bacteria, such as the typhoid bacillus and staphylococci, their use, as shown by Besredka, Gay, Murphy and others, is attended with success. Others, such as the streptococci, reported by Kinsella and Swift, are less valuable on experimental laboratory animals than the non-sensitized. Th. Smith accounts for the conflicting reports on the use of such sensitized bacterins by the inability to control the degree of saturation by any known methods of titration. He assumes an analogy between the union of antiserum and bacteria and that of toxin and antitoxin. With the latter he has shown that in a mixture of toxin and antitoxin the maximum immunity was produced when there was excess enough of toxin to produce a local lesion. With the quantity of toxin remaining fixed and the quantity of antitoxin increased, the active immunity decreased. It was still present when the mixture was just neutral—that is, produced no recognizable local lesion

in the living animal—but the immunizing properties were entirely lost when the antitoxin present was double the neutralizing dose. The increased immunizing properties of sensitized bacterins are doubtless due to the mixture's greater penetrating power. More tissue cells are stimulated and more antibodies are formed. The marked success of the simultaneous treatment of hog cholera may be due to the wider distribution of the virus under the influence of the immune serum. The possibility of unfavorable results with sensitized living bacteria is also apparent in that the more widely they are disseminated the greater their power of producing infection if their virulence is sufficient.

Doubtless what represents the most refined method of immunization is the use of separate parts of bacteria as antigen rather than the whole, either living or dead. On the theory that bacteria possess chief and secondary antigens, investigators have attempted to make use of the former and to exclude the latter, on the theory that liberal dosage of the former will result in sufficient resistance to overcome the infection entirely. For instance, Much has shown that the lipoid derived from the tubercle bacillus will, when injected, produce an immunity to tubercular infection. While this method of immunization is not yet in practical use, it promises much in that it would eliminate from vaccines their harmful and at the same time non-immunizing substances.

It is a well-known fact that tuberculin therapy in its early application fell into disrepute largely due to the lack of knowledge of antibody reactions and the cardinal principles of immunity. Of recent years, through painstaking work of many investigators, its prestige is being somewhat established and its value becoming recognized, while at the same time its possible dangers and limitations are recognized. So, too, Wright's method of vaccine treatment, while recognized as an unquestionably powerful therapeutic weapon, is, because of unskillful application, use in cases where not indicated, and commercialization, in danger of falling into the same disrepute. Its application is a serious procedure and demands careful control and the same preliminary training and study should be required of those who apply it as are required for all other branches of specialized medicine. The value of active immunization depends upon whether it is applied as a prophylactic measure or as a means of control after the disease has gained a foothold. For the former purpose it is a logical and rational method of treatment,

proven so in the case of smallpox, rabies and typhoid. Sufficient immunity to protect against accidental or spontaneous infections may readily be established, since the degree need not be much above normal. The application of the method in the treatment of a disease already established by the preparation of a product from the bacteria by which the disease is caused depends upon the condition of the individual case. Disease production following the entrance of a microörganism into the animal body depends upon two factors, the offensive powers of the organsim and the defensive powers of the body. If the latter are greatly in excess the organisms become localized and are rapidly destroyed and recovery results. In such case no form of treatment is required. If, to the contrary, the virulence of the organism is high and its offensive powers surpass the defensive powers of the body the infection becomes generalized, the tissues and blood streams are invaded and death is likely to occur. Here, again, active immunization is not indicated because already sufficient antigen is present if it could be utilized, and the small quantity contained in a bacterin would not be sufficient to change the outcome. To use a living vaccine at this stage would be folly, since already the body is overcharged. If the struggle between invading organism and the body is nearly equal, and the defenses are sufficient to check the infectious process so that it assumes a chronic, localized form spreading but slowly, if at all, encapsulation by fibrin or other tissue changes may occur, or pressure due to cell detritus may offer interference. In either case protective antibodies are diverted from the bacteria and combine with the obstructing mechanism and no form of immunization can be of help until surgical treatment removes the same. Systemic causes may at the same time operate to prevent the healing of a lesion. The supply of circulating antibodies may be sufficient to hold the lesion in abeyance, but owing to the small quantities of bacteria in contact with the blood stream there is insufficient antibody formation. This is an ideal condition for vaccine treatment. In generalized systemic infections where there is acute sepsis and bacteria are multiplying rapidly in the blood stream, and the defensive forces of the body are overwhelmed by the flooding of the bacteria, vaccines are useless and often harmful, since the tissues are already saturated with antigen, and if capable of antibody production this would certainly occur without the limited additional antigen contained in the vaccine. In a condition in which bacteria are in the blood stream but not multiply-

ing there, being given off by a local lesion such as endocarditis, and the case has assumed a chronic or subacute condition, the use of vaccines may be justified. The data at hand do not suffice either to warrant or condemn their use, but theoretically the treatment is sound.

In acute diseases, such as pneumonia, typhoid, hemorrhagic septicemia, etc., vaccine treatment during the course of the disease has little justification. In some of these the antibodies present are greatly increased over normal, but the patient is seriously ill in spite of no bacteria being demonstrable in the circulation. The use of vaccines in such cases, if it serves at all, can only serve to increase the antibodies which are already present in quantities far above the normal and sufficient to protect if they could only be utilized. The bacteria during the short course of the disease are in many cases extremely resistant to the action of antibodies, and the production of immunity is delayed until just before or at the crisis, and the introduction of vaccines could scarcely be hoped to alter the outcome. In acute infections which run a specific course there is no theoretical basis for vaccine treatment.

Time does not permit a full discussion of passive immunity. This type, as has been said, is produced by the introduction of a serum which contains antibodies and its effect upon an animal suffering from disease, barring the possibility of anaphylaxis, is harmless. In veterinary practice the principal antisera used are for tetanus, hog cholera, hemorrhagic septicemia, blackleg, anthrax and streptococcic infection. The results obtained with all except the latter are gratifying. The principal difficulties in the use of these in the past have been due to administration of doses too small to be of any marked benefit. To illustrate, only a few years ago the dose of tetanus antitoxin for the horse was recommended at from 500 to 1500 units. Larger dosages are now advised, but they are undoubtedly yet too small. In human practice the dosage recommended is the maximum, 10,000 to 20,000 units intravenously with repetition in from 18 to 24 hours with 5,000 to 10,000 intramuscularly. As a prophylactic, dosage of not less than 1,500 units is advised. With this treatment the mortality of the disease has been reduced from 80 or 85 per cent to 60 or 65. If such quantities are required for the human, how futile must be the small quantities used by veterinarians! The almost prohibitive cost of the treatment for large animals practically precludes the extensive use of this therapeutic agent, but

the same should not be condemned as worthless so long as the quantities used are so small.

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AMERICA'S DANGER IN THE NEW WORLD BATTLE FOR FOOD.*

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The problem of abolishing war is the problem of abolishing hunger. Today, with the Foch armistice in operation, the world is still in the midst of a battle for food. America is a participant in this battle, little as the well-fed minority of our people may be disposed to realize it, and we must acquit ourselves as well in the war that has not ended as in that which is just being brought to a close by negotiations in France.

Hunger caused the collapse of Germany. Let us see that it does not cause disaster to the Allies, now in the flush of their overwhelming victory. The morale of the German soldier in the trenches was weakened far more by the thought that his family at home was almost, if not quite, starving than by the battering of the Allies' war machine. The whole fabric of Middle Europe fell apart because its peoples could not face starvation year after year and keep up their courage.

We shall not need a League of Nations if we can conquer this most formidable belligerent of all, and if we have a League of Nations it will be powerless to prevent, even though it may lessen, war unless the food problem of the world is solved. If the League of Nations and the victory over hunger become parallel

*Presented at February Meeting, V. M. A. of N. Y. City.

influences, then indeed we may look reasonably forward to a period of protracted, perhaps even permanent, peace on earth.

Apart from the appalling destitution that has accompanied the war, there remains a permanent hunger problem, due to the great increase of the earth's population in the last hundred years and the wasteful neglect of proper development of the sources of food supply.

America's role of a bountiful provider has been a forced one. The great volume of supplies that we sent to help our Allies in their direst need was accumulated only by stinting our own people. This stinting, of course, has not fallen on the well-to-do; it never does. It has fallen chiefly upon a great part of our population, at least fifty per cent of the whole, which was insufficiently nourished before the war and has patriotically denied itself still further in order that the needs of our government might be achieved. It will be well to realize that the foremost task of reconstruction in America is to settle the food question here, and if we do not realize this our other political and economic virtues as a nation will not see us through the trying days that are to come.

The supply of animal food is at the basis of the nutrition of every people. How can we expect to continue long our complacent endurance of 70 cent bacon and 20 cent milk? We must find ways to break the force of this ominous situation or we shall be quickly brought to our senses.

Without going beyond the Empire State of our Union, we can see the facts clearly. Of the 22,000,000 acres of farm land in New York, only 9,000,000 are under cultivation. The animal food supply was one-half of the people's diet in 1840. Today it is less than one-third, and growing still less.

In 1870 there were 5,000,000 sheep in this State, but in 1916 the number had fallen to 400,000. Of the animals which remain $5,000,000 to $7,000,000 worth is lost annually from infectious and contagious diseases which should be prevented by proper control through a system of veterinary sanitary police.

Though New York is the richest state in the Union, the farm mortgage still haunts the agriculturist here. There are more of these mortgages in New York than in any of the Middle or New England states. We do not realize that we have more abandoned, idle and unprofitable farms than any other Eastern state.

What is the result of this? There is no more dire poverty or keener suffering in the world than is to be found on the lower

east and west sides of New York. Fifty per cent of the people of the state are without sufficient nourishment. Only recently we have been startled by statistics showing that 23 per cent of the school children of this city are underfed. A survey has disclosed that the average daily consumption of milk for approximately 6,000,000 people in the metropolitan district is one-half glass per day, though the minimum for a growing child should be one pint and a half per day.

There is another aspect of the problem. Last winter we had an average of seventy-five deaths a day in New York City from pneumonia for six consecutive weeks and an equal number of deaths from tuberculosis. These fatalities were due largely to under-nutrition.

It is a common fallacy to assume that the farmers are always well fed, even if the people of the cities lack. The truth is that at least fifty per cent of the population of America, city and country together, is not able to obtain sufficient food. The farmers are compelled in many cases to sell the best of their products in order to provide for debts and pressing needs in other directions, and they struggle along with what is left.

What is the remedy for this? I offer two main suggestions:

First, that we should establish community abattoirs and food conservation stations.

Second, that we should restrict our exports of food products so that the price levels in this country will fall within the reach of the average family.

The community abattoir is a means by which we can surely bring down the price of meat. Each abattoir so established ought to be in charge of a competent animal engineer, who would see that full use was made of the supply of animal food in the community and that the quantity of this supply should be steadily increased until it would become sufficient. One of his functions would be to reduce and eliminate infectious and contagious diseases among food animals, and thus cut off a great loss of which the public does not seem to be aware.

Another step would be to see that the farmer receives full value for his animals by conserving every pound, so that the hide, horns, hoofs and other products should be made to yield him the maximum revenue. Under the present methods of selling it is often the case that the producer loses $45 of the value of each animal through inability to market it properly.

The animal food conservation station would show the farmer how he could make a good profit from food animals; what he could grow best on his farm in order that he might maintain the largest possible number of animals with success; how each community might provide animal and vegetable food in abundance, wool for cloth, leather for shoes and numerous by-products of animals, such as glycerine, for community needs.

I should say that it would be a fair estimate that the establishment of these stations would reduce the price of meat fifty per cent, in addition to multiplying greatly the supply of other foods whose productivity and nutritive value depend so largely upon animal industry.

America is bountifully able to provide food for its own people, but we cannot do so if things are to continue thus out of joint in our economic system. We are a wasteful people, because once there were ample supplies for all when our rich farm lands were tilled by a comparatively few pioneers. Now, with a great and growing population, we are pinched. Retail prices of food are so high that a continuation of them is virtually impossible. Shall we continue to ignore our own dangers while realizing those abroad?

The success of our American system of republican government was based upon a sufficiency of food, which caused our people in the formative period of the republic to be strong, steady and clear-headed. We must go back to that sufficiency if we are to meet our opportunities in the new period of political and economic development which we face. Europe has shown us vividly that peoples who do not know where they are to get the next meal and whether that meal will be sufficient are a danger to the whole world. Let us be warned in time.

The Oklahoma State Board of Veterinary Medical Examiners will meet in Oklahoma City April 28, 29 and 30, 1919, for the examination of applicants who desire a license to practice in the state.

THE AMERICAN VETERINARY MEDICAL ASSOCIATION.*

N. S. MAYO, Secretary,
American Veterinary Medical Association.

It is not necessary, I am sure, to emphasize to you the need of organizations. There is not a trade, occupation, or profession in America, and one may say in the world, that is not organized. Individual effort can accomplish relatively little. When individual effort is organized it is great. As veterinarians, we have need of local associations to deal with problems of every-day practice and problems that are common to our profession in a given locality. Then there is need for a state organization that will enable us to cope with the problems that affect our own state, such as the laws governing practice, veterinary education, the control of transmissible animal diseases and the promotion of the live stock industry of the state. There is also need for regional associations, such as this and the Missouri Valley Veterinary Medical Association, that have still a wider sphere of usefulness and that shall take up regional veterinary problems in which they are particularly interested. In presenting to you the importance of the A. V. M. A., I also wish to emphasize the value of local, state and regional associations and to urge every one of you to join them, attend them, take part in the program and in the work of the association. And I want to assure you that the A. V. M. A. will assist as best it can in advancing the interests of these associations and the profession. It is due to Dr. V. A. Moore of the A. V. M. A. that I am here tonight to represent that association and to assist in this meeting.

The American Veterinary Medical Association was organized as the United States Veterinary Medical Association fifty-five years ago in New York City and the membership in those early days embraced the names of the pioneer veterinary educators and leaders in the United States. For many years the association was essentially an eastern association and the meetings were held in New York, Boston, Philadelphia and Washington. The first meeting held west of the Alleghanies was at Cincinnati in 1884 and the next western meeting was in Chicago in 1890. Since that time the majority of the meetings have been held in the central or western states; only once has the association met in a southern

*Address delivered before Southeastern States Veterinary Medical Association, Birmingham, Alabama, February, 1919.

state, when the meeting was held in Nashville, Tennessee, in 1897. Arrangements had been made to hold the 1914 meeting in New Orleans, but on account of the outbreak of foot and mouth disease the meeting was canceled. The meeting to be held next fall in New Orleans is the first to be held in the far south, and it is believed that it will be a valuable means of stimulating an interest, not only in veterinary work in the south, but will also aid in the development of the live stock industry in a region that is so well adapted to the purpose.

The work of the American Veterinary Medical Association for many years was devoted largely to the presentation and discussion of subjects of interest to the practicing veterinarian, and it was not until the Association began to hold some of its meetings west of the Alleghany Mountains that the Association became national in its scope and began to take an active part in dealing with national veterinary problems, such as legislation looking toward the proper recognition of veterinarians in the United States Army, the question of veterinary education and the control of transmissible animal diseases. Within the past ten years the growth of the American Veterinary Medical Association has been rapid, and at the present time there are more than 3,500 members, most of them in the United States and Canada, but some are scattered nearly all over the world, India, Japan, the Philippines, Hawaii, West Indies, Central and South America and the leading countries of Europe. Its membership, active and honorary, includes the leading veterinarians of America and the world. It is the largest, and I believe the most efficient, organization of its kind in the world.

In 1915 the A. V. M. A. established the official monthly journal that is now so ably edited by a distinguished member of this association, Dr. W. H. Dalrymple of Baton Rouge. This journal is a high-class magazine, presenting the best current literature of our profession; but also keeps the Association in touch with its members, as well as with other professions, the live stock industry and the veterinary profession of the world. If you are not a member of the A. V. M. A. and do not care to join you should certainly subscribe for this excellent journal.

Among the problems that are national in character, a few will be mentioned that have received the active support of the A. V. M. A.

For many years the veterinarian in the American Army was neither an officer nor enlisted man. The A. V. M. A. took up

the problem of the army veterinarians many years ago to secure a proper recognition for the veterinarian, as well as to secure an efficient organization of the army veterinary service, and it is due almost entirely to the efforts of the A. V. M. A. that the present organization was established. While the foundation for an efficient army service has been laid, there is still work to be done to put the service on a high plane, and this service will need outside assistance for some time to come.

Another important work of the A. V. M. A. has been to assist and support the Bureau of Animal Industry, the best organized and most efficient bureau of its kind in the world.

This organization, in coöperation with state and local practitioners, has stamped out of the United States two great animal plagues, contagious pleuro-pneumonia and foot and mouth disease, plagues that have ravaged Europe "So long that the memory of man runneth not to the contrary." You are also familiar with the splendid progress being made in the eradication of the cattle tick and the control of other animal plagues. The A. V. M. A. has not only actively supported the Bureau of Animal Industry but has also taken a prominent part in securing proper remuneration for veterinarians in the Bureau service. In peace, the B. A. I. is the largest single employer of veterinarians in America and the number will probably be considerably increased in the near future. The veterinarians in the Bureau have probably been the hardest worked and the poorest paid of any professional men. A substantial increase in their pay has just been secured from Congress. It must be remembered that whatever benefit accrues to veterinarians now in the service will also apply to veterinarians who may in the future enter the service.

Another problem that has received much attention from the A. V. M. A. has been veterinary education, and a tremendous advance has been made in the past few years. Entrance standards have been raised, the courses in the veterinary colleges have been lengthened and more thorough work done. It is evident that upon a thorough preparatory and technical training the future of the veterinary profession rests. At present veterinary education is undergoing a rapid transformation, particularly from private to state schools, and the problem is one that is receiving the most comprehensive consideration by the American Veterinary Medical Association. While the subject of veterinary education is essentially a national one, the advancement of veter-

inary education should receive the active support of every member of our profession.

When an appeal for help came from the stricken members of our profession in Belgium and France, it was sent to the A. V. M. A. through Professors Vallée and Liautard. Through the A. V. M. A. an appeal was made to the profession in America and more than five thousand dollars was raised by voluntary contributions. This is known as the "Liautard American Veterinary Relief Fund." This is for the relief of veterinarians and their families in the allied countries. Two thousand five hundred dollars have been sent to Professor Vallée in France and the families of American veterinarians who were in need have also been assisted.

Just as soon as the armistice was signed, problems developed in connection with reconstruction that affected our profession. To assist in dealing with these, committees were appointed by President Moore, both for the United States and Canada.

I have endeavored to give you a brief summary of the work and scope of the A. V. M. A. and the opportunity it offers for promoting the progress of the veterinary profession in all lines. In order to make substantial progress, we must have an organization that shall receive the active support of members of our profession. Every individual veterinarian owes it to his profession and to himself to join the A. V. M. A. and help make our profession in America what it should be—the best in the world. There are great problems that must be met and solved. America is essentially agricultural, and a permanent and successful agriculture rests upon the live stock industry. This must be protected and developed, and it is upon us as veterinarians that this responsibility rests. We must not only join our associations but each one individually must work toward these ends, for it is a good work well done that is the key to all substantial progress.

The American Veterinary Medical Association stands for the best interests of our profession. It stands for higher and more thorough education. It stands for a high professional ideal. It stands for the advancement of the live stock industry and for efficient veterinary service in the Bureau of Animal Industry, in the army, in the state and in the community. Membership in the A. V. M. A. is a stimulus to better professional service and to higher ideals. We need your active support and you need the A. V. M. A., for it will help you in your chosen profession and

in your service to humanity, and this is, after all, the measure of a real man.

I believe that the next meeting of the A. V. M. A. in New Orleans will be one of the best and most interesting in the history of the Association, and that substantial progress will be made and that the veterinarians of the new and progressive South will do their part in building up our profession, not only for this year, but for all time.

REPORT OF COMMITTEE ON INFECTIOUS ABORTION.*

Your committee reported at your 1917 meeting at some length on its efforts to summarize the knowledge of and opinions on the bovine infectious abortion problem of those representative veterinarians and live stock men of America who had had experience with the disease. No recommendations having in view the adoption of active measures to control the disease were made as a result of the committee's studies. Since our last report much water has gone under the bridge, but it has not been all clear water. The menace from the disease looms larger. It will not disappear of its own accord or without a supreme and unified effort on the part of all individuals and organizations concerned.

We commend the action of the American Veterinary Medical Association in appointing a committee to study this same problem. Two of the members of your committee are serving on that committee, and we have assurance that something of merit will be accomplished by the vigorous manner manifested by its chairman and individual membership in setting themselves to the task. The new committee referred to should undertake to establish new facts and a deeper and more comprehensive insight into the disease.

It appears to us that your committee should confine itself to the task of keeping your association in touch with the developments that proceed out of research and experience with the disease and of crystallizing the thought of those who are best qualified to think on this problem, with the result that more or less definite recommendations may be presented to you from year to year. We propose to present to you the annual increment of

*Presented at the 1918 meeting of the United States Live Stock Sanitary Association at Chicago, Illinois.

bibliography dealing with the great problem in order that it may be added to the rather comprehensive list already published by you and further to seek for your consideration a paper reviewing the accessions to our knowledge for the year and present by one in a position to command your attention.

Your committee wishes to present for your thoughtful consideration its conclusions as follows:

Bovine infectious abortion is in fact or potentially the greatest menace to the cattle industry of America. There is at hand sufficient evidence to warrant the conclusion that it is a dangerous communicable disease of cattle and possibly of swine if not of other domestic mammals but not of man. Moreover there are available physical and laboratory methods, based on the accepted belief that the disease is primarily due to Bact. abortus (Bang), to enable live stock sanitary authorities to make a reasonably accurate diagnosis (a determination of the presence or absence of infectious abortion in a herd) sufficient to satisfy the demands of intelligent and reasonable men, and it is not the part of wisdom or caution to hesitate longer to apply our knowledge to an official attempt to suppress the disease in spite of the acknowledged limitations of that knowledge.

Therefore, it is the best judgment of your committee that your association resolves that in its opinion:

Bovine infectious abortion is a dangerous communicable disease of cattle due to a specific germ, Bact. abortus (Bang), and that hereafter it shall be considered as such and as coming within the meaning of the laws or regulations of the states having general or special laws, or regulations, covering the handling of contagious diseases of live stock and that in other states laws or regulations should be forthwith adopted to bring the disease under official cognizance.

Regulations rather than specific laws, capable of adaptation to the changing conception and added knowledge of the disease and to local conditions, are recommended to the various state authorities for adoption.

Live stock sanitary authorities of the Federal government and of the respective states should immediately take steps to make public to the live stock interests of the country that bovine infectious abortion is a dangerous communicable disease of cattle, at least, and that it is a reportable disease within the meaning of the live stock sanitary laws and regulations of the nation and

state. Also, the Federal Bureau of Animal Industry and the respective state authorities should define, as their judgment and local conditions warrant, as clearly as possible, what constitutes the presence of the infection; i. e., what are the criteria by which a layman or a veterinarian may be guided in making a decision as to the diagnosis of the disease in a herd.

Penalties commensurate with the seriousness of the offense should be imposed in flagrant cases of violation of regulations covering the movement of infected or exposed animals, having in mind the prevention of the introduction of infected stock into healthy herds or into infected herds without the purchaser's knowledge of the consequences. The traffic in sterile or infected cattle should cease except for immediate slaughter or under such official sanction as will safeguard the cattle industry of the country.

There should be instituted without delay as a necessary economic measure a campaign of education of all live stock men relative to the seriousness of bovine infectious abortion and its consequences, such as interference with breeding and milk secreting functions, and relative to the measures that can be readily applied with assurance of at least partial success in the control of the disease; and adequate federal and state appropriations are urged for the furtherance of research into the nature of the disease and for the most effective methods of its suppression and control. To this end, we recommend federal aid for coöperation with the states that are in a position to coöperate effectively in studies on bovine infectious abortus.

Ward Giltner,
G. M. Potter,
E. S. Bayard,
E. C. Schroeder,
T. H. Ferguson,
Committee on Infectious Abortion.

[Note.—This report was not adopted but was referred back to the committee.]

CLINICAL AND CASE REPORTS.

TOOTH IN THE BRAIN.

Dr. E. Biart, Leavenworth, Kansas, reports having found a molar tooth in the cerebrum of a hog that was slaughtered for food. The hog was apparently normal in every way. The tooth was about the size of a hazel nut, and plainly showed the characteristics of a molar tooth.

UNUSUAL CASE OF QUADRUPLETS.

The following interesting case of bovine quadruplets has just been reported by Dr. John F. McKenna, Fresno, California. On January 29, 1919, Dr. McKenna was called to see a case of retained placenta in a two-year-old Holstein heifer which had just given birth to four calves. The first, a heifer, born January 28 at 2 a. m.; the second, a bull, born at 8 a. m. the same day; the third, a bull, born at 10 a. m.; and the fourth, a bull, which came at 11:30 a. m., but was born dead. The three first calves were all alive and able to stand in 24 hours. The mother was very weak and was placed on stimulant treatment, and the placenta removed. A report from the case on February 20 was to the effect that the three calves were alive and the mother in the best of health and doing well.

FOWL CHOLERA.

Subjects.—Variety of breeds, some pedigree utility strains, others common barndoor fowls, all obviously affected more or less when seen.

Symptoms.—The onset of the disease was sudden; client noticed the birds, as he termed it, squirting, and the excrement passed had an offensive odor and adhered to the feathers about the vent, staining it whitish yellow to greenish or brownish color. Loss of appetite, great prostration, staring feathers. The birds moped, or sat around with tails and heads down, combs dark

colored, swaying gait, trembling, extreme thirst and severe diarrhœa, high fever, and rapid emaciation present.

Post-Mortem.—Liver enlarged, dark colored, and tears easily. The intestines were congested and contained a frothy material. Hemorrhagic enteritis. Spleen enlarged. Small (petechiæ) present on heart and coverings (pericardium). Epicardium, kidneys dark and enlarged. Blood does not coagulate readily. Owner found dead birds in the nest, which made him think someone had poisoned them.

Diagnosis.—Fowl cholera, after post-mortem.

Prognosis.—Unfavorable.

Treatment.—All the sick birds were removed from the nest, and dead ones cremated. The hen-houses and nests were cleaned with McClintock's germicidal soap and sprayed with limewash and carbolic acid. The houses and perches were creosoted and fumigated with sulphur and formaldehyde.

Medicinal Treatment.—

Zinc Sulpho. Carb........................grs. 15
Sodium Sulph...........................grs. vii
Hg. Bichlorid...........................grs. vi
Acid Citric............................grs. iii

M. haust.

Sig.—This was dissolved in a gallon of water and given to the birds in place of drinking water at troughs, which were scrupulously cleaned.

Diet.—Sour milk, dry food, containing powdered charcoal; no hot-mash food allowed.

Hygiene.—The birds were fed out of troughs previously disinfected, and not off the ground. The yard was disinfected daily with Jeyes' fluid and covered with fine wood turnings, which were afterwards burnt along with excrement.—Henry B. Eve, M. R. C. V. S., Folkestone, in *Vet. Journal.*

The American horse, so writes The Listener in the Boston Transcript, has won peculiar honors in the great war, as well as the American Indian. The English captain, Sidney Galtrey, in a book entirely devoted to "The Horse and the War," declares in so many words that the Yankee horse "is the real equine hero of the war."

ABSTRACTS.

FIBROMA OF THE TESTICLE IN DOMESTIC ANIMALS.

R. Galli, in *Il Nuovo Ercolani* of 1913, published an article on this subject which is of some interest from the great rarity of fibromata of the testicle in animals, and from the fact that it records three characteristic cases.

The fibromata are benign tumours. They vary in size from that of a pea to a man's fist, and present a small lobulated surface. They are movable and hard; and sometimes they are not uniform. Sections show a shining aspect, a compact texture, a white or yellowish color, and a periphery which is rounded or has more or less pronounced excrescences. There may be calcified or ossified zones in which the sectioning knife encounters great resistance. On account of the compression caused by these tumours, the tissues constituting the scrotal diverticula tend to excoriation and ulceration. Fibromata grow slowly, and attain a great size. They sometimes undergo sarcomatous transformation, and may then grow rapidly.

Of the author's three cases, the first was in an old ass, the second in a young ass, and the third in an old horse. Very clear and demonstrative microscopic preparations were obtained by staining sections by Van Geissen's method. In all the cases, the typical texture of the fibroma was observed.—*Revista de Higiene y Sanidad Pecuaris.* (Vet. Rec.)

WHAT IS "PTOMAIN" POISONING?

Under *Current Comment,* the Journal of the American Medical Association, March 8, 1919, has the following to say with regard to "ptomain" poisoning, which may be of interest to some of our readers, as we have recently heard of a diagnosis of this kind having been made in connection with the deaths of a number of mules after arrival at a Southern point:

The term "ptomain" poisoning, says The Journal, has become a cloak for ignorance. Jordan (Jordan, E. O.: Food Poisoning, University of Chicago Press, 1917) says that "ptomain poison-

ing is a convenient refuge from etiologic uncertainty.'' In fact, any acute gastro-intestinal attack resulting from a great variety of causes is apt to be called ''ptomain'' poisoning. Selmi, in 1873, first used the word ptomain (from the Greek meaning a corpse) to include the poisonous products of putrefaction which gave the reaction then looked on as characteristic of vegetable alkaloids. From the time of Selmi, when ptomains were regarded as animal alkaloids, our conception of these substances has changed markedly. The last attempt to give precision to the term was by Vaughan, who defined ptomains as intermediate cleavage products of protein decomposition. Rosenau and his associates at Harvard have been searching in vain for the past year and a half for ptomains that might cause gastro-intestinal or other symptoms.

Split products of protein putrefaction are readily isolated. Some of these products have physiologic activity, but none of them thus far have been demonstrated to be poisonous when taken by the mouth. The so-called ptomains isolated and described by Selmi, Nencki, Brieger, Schmiedeberg, Faust and Vaughan were usually obtained from putrid organic matter that had decomposed past the point at which it would be used as food. Furthermore, most of these substances were tested by injecting them subcutaneously or intravenously into animals. Many substances are poisonous when thus introduced parenterally, though they may be harmless by the mouth. Again, many of the so-called ptomains isolated and described have since been shown to contain impurities. Chemists are now seldom confident of the purity of protein fractions, even when obtained in crystalline form. The chemical search for split protein products as the cause of ''ptomain'' poisoning has practically been abandoned. Most of these split products are amins, which are either not poisonous at all, or no more so than their corresponding ammonia salts. The chemical resemblance between muscarin and cholin has directed the work toward the phosphatids, but thus far this line of research has not helped solve the puzzle of ''ptomain'' poisoning. Chemists avoid the use of the word ptomains, for the reason that it lacks precision. This is a curious instance of the popular use of a technical term that sounds well, but means little. Only clinicians cling to it as a convenient refuge.

Ptomain is a term for chemical substances of uncertain origin, unknown nature, and doubtful existence.

PSEUDO-TUBERCULOSIS OF THE PIG (CASEOUS ADENITIS) AND VISCERAL PSEUDO-TUBERCLES.

Caseous glandular lesions in the form of nodules, or more rarely of visceral tubercles, which it is difficult to distinguish from tuberculosis, are frequently found in the pig. Chaussée, in *La Recueil de Médecine Vétérinaire* of last year, published the following account of these conditions.

The author relates five cases of this nature, in which inoculation into guinea pigs proved that the lesions were not bacillary, while the naked eye exmination could give no certainty on the point. These observations enabled him to gain a more exact knowledge of the two classes of lesions.

One of these five observations is here given. A pig of fifteen months old, in excellent condition, had both the maxillary glands very slightly hypertrophied. In each of these glands, some fifty caseous points were found. They were hard, had no fibrous envelopes, were of a yellowish cream color and from one to seven millimetres in thickness. The intermediary glandular tissue was gray, clearly distinct from the lesions, in full vitality, and apparently normal. There were no other visceral lesions. When one of the "pseudo-tubercles" was crushed and microscopically examined, no tubercle bacilli were discovered. The inoculation of guinea pigs confirmed the non-tubercular nature of the condition.

This example and the other cases reported by the author show that nodular caseous non-tubercular lesions of the lymphatic glands exist fairly frequently in the pig. Their differentiation from tuberculosis is not always easy, and is based upon the following characters.

The non-tubercular nodules are not regularly spherical, and have no fibrous envelope. Their caseation is complete and uniform, dry, and with calcification. Their color is that of gum, or greenish.

In the lesions due to Koch's bacillus the nodular form is rare in the glands of the pig. Glandular tuberculosis is generally of the hypertrophic type, with complete or incomplete degeneration in the form of masses extended over the whole of the major part of the gland. If these tuberculous lesions are of some months' standing, the viscera are usually affected by generalization, while in "pseudo-tuberculosis" they are generally intact. In one of the author's cases of "pseudo-tuberculosis," however, tubercles

were found in the lung and the liver, but these were much harder and more calcified than lesions due to the tubercle bacillus. In cases in which tuberculosis and "pseudo-tuberculosis" co-exist the double diagnosis may be difficult, but to recognize the presence of tuberculosis is sufficient.

The lesions of this "pseudo-tuberculosis" are easy to distinguish from parasitic tubercles of the liver—echinococci, and cysticerci.

Not having been able to make the necessary cultivations and inoculation, the author has not investigated the cause of this porcine "pseudo-tuberculosis." He regards the lesions as probably caseous sequestra, due to a previous benign infection of the digestive apparatus. His sole object in publishing his article is to show that it is necessary in practice to know that these lesions exist, and to distinguish them from tuberculosis due to Koch's bacillus.—*Revista de Higiene y Sanidad Pecuarias.* (Vet. Rec.)

ARMY VETERINARY SERVICE

CONFERENCE OF VETERINARY CORPS.

At a conference of members of the Army Veterinary Corps, held in St. Nazaire (Loire Inferieure), France, February 7-11, 1919, the following program was executed:

SATURDAY, FEBRUARY 8.

Morning—Opening address, Chief Veterinarian, A. E. F. Summary of work in hand, Lieutenant Colonel Edmunds. Organization into sections.

Afternoon—Post-mortem on seven animals of Veterinary Hospital; reactors from I. P. test, January 22, and on animals which reacted to blood test, January 22, but not to I. P. test. Majors Merillat, McKillip, Gould, Ratigan and Captain Jervis.

SUNDAY, FEBRUARY 9.

Morning—The various mallein tests compared, Major Hilty. Value of the laboratory tests, Lieutenant Liebold. Blood test on animals which did not react, January 22, Captains Zingher and Weiss, M. C. Technique of I. P. test, Captain Balthaser.

Afternoon—Mallein I. P. test on 4,000 animals, Veterinary Hospital and Remount.

MONDAY, FEBRUARY 10.

Morning—Discussion on seven animals from Remount, killed and posted. Majors McKillip and Ratigan and Captain Jervis. Result of Pasteur Laboratory on some animals, Major Rappin and Captain Jervis. Result of Base Laboratory, Captains Zingher and Weiss, M. C. Classification of reactors, Major McKillip.

Afternoon—Reading reactions, Majors McKillip, Merillat, Ratigan, Gould and Captain Balthaser.

TUESDAY, FEBRUARY 11.

Morning—Discussion on result of post-mortem, February 8, Majors Merillat, McKillip, Gould, Ratigan and Captain Jervis.

Afternoon—Address, Lieutenant Colonel Aitken, of British Army. Address, Lieutenant Colonel Broque-Ruseau, of French Army. Organization of Veterinary Corps, Chief Veterinarian, A. E. F.

Evening—Banquet.

Captain Howard N. Beeman, formerly Veterinarian of the 10th Division, Camp Funston, Kansas, has been transferred to Camp Meade, Maryland, as Camp Veterinarian.

Captain Joseph F. Crosby, formerly Veterinarian with the 19th Division, Camp Dodge, Iowa, has been transferred to Camp Grant, Illinois, as Camp Veterinarian.

Lieutenant Herbert B. Nixon, formerly stationed at New York City, has been honorably discharged from the service.

Captain Herbert J. Brotheridge, formerly at Auxiliary Remount Depot, Camp Johnston, Florida, has been honorably discharged and has been succeeded by Lieutenant Earl S. Markham.

Lieutenant Harve Frank, formerly at Camp Funston, Kansas, has been honorably discharged.

Lieutenant Guy J. Phelps, formerly at Camp Travis, Texas, has been honorably discharged.

Major Robert C. Musser has been directed to report at Camp Lee, Virginia, for duty as Camp Veterinarian.

Captain Morgan B. Lamb, formerly of Camp Lee, has been ordered to report at Camp Bowie, Texas, for duty as Camp Veterinarian.

Majors Klein and Gilliland received honorable discharges from the Army early in February and have returned to their former vocations.

Lieutenant-Colonel C. J. Marshall received an honorable discharge from the Army February 20 and has returned to Harrisburg, Pennsylvania, to resume his duties as State Veterinarian.

The latter part of January, Major Pierre A. Fish received a communication from Professor Vallée in France notifying him that he had been elected an honorary president of the Anglo-American-Franco-Belgian Veterinary Relief Fund. The Journal desires to extend to the Major its hearty congratulations.

The Journal has received the news, unofficially, that Colonel D. S. White has returned from France, having been honorably discharged, and has returned to his home at Columbus, Ohio.

Lieutenant Charles E. Caulfield, of New York, attached for a time to the Army Veterinary Corps, has been sent to France to aid in the work of reconstruction through the Knights of Columbus service.

Lieutenant F. T. O'Sullivan, of New York City, with the American Expeditionary Forces, has returned to this country. Lieutenant O'Sullivan was with Major Knowles, of Helena, Montana.

Captain Charles S. Chase, Lieutenant A. J. Ward, Lieutenant Joseph P. Mack and Lieutenant A. J. Allott, of the Army Veterinary Service, have been released from service and returned to practice in New York.

Captain H. Ticehurst, of Morsemere, and Lieutenant William P. Grimes, of Hawthorne, New Jersey, have been released from Army Veterinary Service duties, the former having resumed practice and the latter his position in the B. A. I.

Lieutenant E. B. Parker has received his discharge from the army and has returned to his home in Newton, Illinois, where he has entered practice.

Lieutenant W. J. Walsh, formerly of Camp Greenleaf, has returned to his home in Creston, Iowa.

Dr. Hartwell Robbins has been transferred to Washington, North Carolina, from Atlanta, Georgia, where he has been in B. A. I. service.

The Veterinary Examining Board for the State of Colorado is composed of the following members: Dr. G. H. Dickey, Colorado Springs; Dr. R. H. Bird, Greeley; Dr. A. N. Carroll, Pueblo.

ASSOCIATION NEWS.

AMERICAN VETERINARY MEDICAL ASSOCIATION.

INTERNATIONAL COMMITTEE ON BOVINE TUBERCULOSIS.

Publication of this committee, appointed by Pesident Moore, was inadverently omitted in previous numbers of The Journal, the original personnel of which was as follows:

J. G. Rutherford (Chairman), Canadian Pacific Railway, Calgary, Alberta; Jacob Traum, University of California, Berkeley, California; C. E. Schroeder, B. A. I., Bethesda, Maryland; J. G. Wills, 27 Matilda Street, Albany, New York; *S. H. Ward, State Capitol, St. Paul, Minnesota; J. J. Ferguson, Honorary Member, c/o Swift & Co., Chicago, Illinois.

*Owing to the unfortunate death of one of the valued members of the committee, Dr. S. H. Ward, President Moore appointed Dr. Charles E. Cotton, State Capitol, St. Paul, Minnesota, to fill the vacancy.

SECRETARY'S OFFICE.

A form letter with statement of dues to the A. V. M. A. has been prepared and sent out to all members who have not paid their dues for the current year. Members must bear in mind that the United States postal regulations do not permit journals to be sent unless the subscriptions are paid. The names of those who are delinquent must be stricken from the subscription list of the journal. Send in your remittance promptly and keep your journal coming regularly. Don't forget this!

OTHER ASSOCIATIONS

MASSACHUSETTS VETERINARY ASSOCIATION.

The regular monthly meeting of the Massachusetts Veterinary Association was held at Boston, Massachusetts, February 26.

One new member was admitted to membership and applications from two veterinarians were read and laid on the table until next meeting.

The resolution of the United States Live Stock Sanitary Association relative to Federal control of interstate distribution of tuberculin was taken up and discussed and the association went on record as approving the action taken by that association at their December meeting regarding same.

HARRIE W. PEIRIE, Secretary.

KENTUCKY VETERINARY MEDICAL ASSOCIATION.

The annual meeting of the Kentucky Veterinary Medical Association was held at Seelback Hotel, Louisville, Kentucky, Feb. 5, and was one of the most enthusiastic and successful ever held by the association. The papers and reports presented were interesting and the discussions were lively.

Dr. Charles F. Fisher presented a paper on "Cattle Practice and Some of the Conditions We Are Called Upon to Treat."

Dr. S. F. Musselman, State Veterinarian, gave a very interesting report on the control of hog cholera. From a loss of $2,000,000 in 1917 there has been a reduction to about $300,000 in 1918. This accomplishment goes to show what is possible by coöperation.

Dr. Gibson, in charge of tuberculosis control work, B. A. I., presented a paper on "Tuberculin Test and the Accredited Herd System."

Dr. H. Gieskemeyer gave an interesting talk on "Diseases of Hogs," and also told of his field experience in the use of hemorrhagic septicemia bacterins on 10,150 head of hogs during the months of December and January.

The following officers were elected for the ensuing year:

President—Dr. W. H. Simmons, Extension Veterinarian, College of Agriculture, University of Kentucky, Lexington.

First Vice President—Dr. Charles W. Fisher, Danville.

Second Vice President—Dr. Ed. Calldemeier, Louisville.

Third Vice President—Dr. F. O. Schneider, Frankfort.

Secretary-Treasurer—Dr. Harry Gieskemeyer, Fort Thomas.

Executive Committee—Dr. R. L. Pontius, Lexington; Dr. Henry Harthill, Louisville; Dr. D. E. Westmorland, Frankfort; Dr. G. P. Isbell, Hopkinsville; Dr. G. W. Pedigo, Glasgow.

The next meeting will be held at the University of Kentucky, Lexington, June 18-19.

HARRY GIESKEMEYER, Secretary.

MISSISSIPPI STATE VETERINARY MEDICAL ASSOCIATION.

The thirteenth annual meeting of the Mississippi State Veterinary Medical Association was held in Greenville, Mississippi, at the Cowan Hotel, Norton Brothers' Hospital and the Chamber of Commerce on February 4-5.

This, as was shown by an unusually large attendance and much enthusiasm, was the best meeting of its kind ever held in the State of Mississippi. The association received the coöperation of many visiting veterinarians from other states, among whom were:

Dr. H. Jensen, Dr. J. D. Reardon, Dr. Johnson of Little Rock, Dr. J. W. Scheibler, Jr., Dr. Buck and Dr. Cochran of Memphis.

The association also enjoyed the hearty coöperation of the B. A. I. forces in Mississippi.

On the morning of February 4 the meeting was called to order at the Elysian Club by the President, Dr. Edwards of Vicksburg. The association was given an address of welcome by Rev. Phillips G. Davidson of Greenville. Dr. J. A. Barger, inspector in charge of tick eradication forces in Mississippi, made a very interesting response.

Mr. R. S. Wilson, who has charge of the demonstration forces in Mississippi, gave a very interesting address on the progress made by the extension forces in Mississippi since he has been in charge. He also made several interesting remarks in regard to the relationship of the work of the demonstration agents and the veterinarians, in which he said that as Mississippi became better supplied with graduate veterinarians such veterinary work as demonstration agents are doing now would then be placed in the hands of the veterinarians.

The next was a paper from Dr. Eichhorn of Pearl River, New York, read by Dr. J. D. Reardon of Kansas City, Missouri, on the control of some of the infectious diseases and the conservation of our live stock.

Dr. H. Jensen of Kansas City, Missouri, gave a very intelligent talk on what we have learned about biologic products.

Dr. W. M. L. Gates of Clarksdale, Mississippi, read a very practical paper on anthrax and its control in Mississippi.

Dr. H. L. Fry of the B. A. I. on hog cholera control work in Mississippi, read a very instructive paper on hog cholera.

Dr. J. J. Jones of the tick eradication forces in Mississippi, made a very interesting talk on the value of tick eradication to Mississippi veterinarians.

On the evening of February 4 the association assembled at the Chamber of Commerce for a business session. The following officers were elected for the incoming year:

President—E. S. Norton of Greenville.

Vice President—J. T. Alston of Tupelo.

Secretary-Treasurer—J. A. Barger of Jackson.

The following were appointed on committees:

Executive Committee—W. M. L. Gates, J. A. Brown and B. T. Huston.

Legislative Committee—Hudson Chadwick, W. M. Ferguson and H. O. Moore.

Diseases Committee—Jno. Olive, J. T. Alston and C. L. Allen.

Program Committee—J. A. Beavers, H. L. Fry and L. I. Lucey.

Dr. W. R. Edwards of Vicksburg was elected as a member of the State Veterinary Examining Board to fill the unexpired term of Dr. James Lewis, deceased.

A motion was made that resolutions concerning the death of Dr. James Lewis of Greenville, Mississippi, be drafted and sent to the American Journal of Veterinary Medicine and the Journal of the American Veterinary Medical Association for publication. A committee was also appointed to draw up resolutions relative to the death of Dr. Taylor of Gulfport, Mississippi, and Dr. Burrass of Boonville, Mississippi.

The association instructed the Secretary of the Mississippi State Veterinary Medical Association to donate $100.00 to the American Veterinary Medical Association for the benefit of the New Orleans meeting if called upon.

On Wednesday, February 5, the association held a very interesting clinic at Norton Brothers' Hospital, which took up the entire day. Many up-to-date surgical operations were performed and were witnessed by live stock men in the vicinity of Greenville.

In the evening a banquet was held at the Cowan Hotel, which was very much enjoyed by the association and visitors. Dr. J. A. Barger presided as toastmaster in his usual entertaining way.

Dr. Shipp, sanitary inspector of the State Board of Health, made a very interesting talk on sanitation. Dr. Shipp was a

guest of the association and his presence was very much appreciated.

The most enjoyable feature of the banquet was a musical entertainment given by Dr. and Mrs. Barclay of Jackson entitled "Musical Episode from Life."

After the banquet the body adjourned to meet again in Jackson in 1920. J. A. BEAVERS, Secretary.

MISSOURI VALLEY VETERINARY ASSOCIATION.

Nearly three hundred veterinarians were registered at the mid-annual meeting of the Missouri Valley Veterinary Association held at the Coates House in Kansas City on February 11, 12 and 13. This is the largest attendance of graduate veterinarians during the twenty-six years of the association's history.

The program was opened by the report of the Committee on Examination, made by Dr. D. F. Luckey, chairman of the committee. He called attention to the confusion existing in shipping regulations in different states and the frequent conflicts between state and federal regulations, and made a strong plea for the establishment of uniform rules with which shippers, veterinarians and railway employees might easily become familiar.

Dr. H. S. Murphey reported for the Committee on Surgery, laying special stress on wound treatment. The importance of removing damaged and devitalized tissues was emphasized. He also gave considerable attention to the value of Dakin's solution in the treatment of wounds in animals, stating that experiments had failed to show its superior properties in veterinary practice.

A very comprehensive and well-prepared paper on the control of infectious abortion was given by Dr. G. F. Jungerman. The cardinal points in the control of this disease are cleaning up of infected premises, segregation of infected animals, removal of retained placentas and thorough cleaning up of affected cows, using for irrigation purposes a weak solution of liquor cresolis compositus every three days. In addition to these measures, bacterin treatments given in series of not less than six injections are recommended.

Blackleg and its control was the topic of a paper rendered by Dr. L. W. Goss. He gave a review of the various methods of immunizing cattle against this disease, together with comparative studies of natural aggressin and a culture filtrate prepared at the Kansas Agricultural Experiment Station. In a rather extensive

use of this culture filtrate, he finds that the immunity after the first five to ten days compares very favorably with that following the use of natural aggressin. A few members in discussing this paper stated that in their hands several culture filtrates had been used with not the best success. However, no adverse reports were made by any one who had used the Kansas product.

Dr. H. S. Murphey reported on some interesting cases in dentistry and described an operation for saving the testicle in ruptured pigs which had been the means of making valuable breeding animals out of what otherwise would have been meat hogs.

Regarding dental affections, he states that practically all dental cases involving the first, second or third cheek teeth in young horses at the time of eruption of the permanent teeth, accompanied with bony enlargement, are due to infection, and recommended extraction and destruction of tooth-forming membranes as a logical treatment.

Dr. N. S. Mayo gave an interesting paper on the treatment of wounds with chlorazene and dichloramin-T, illustrating their use with a series of motion pictures.

Dr. J. W. Connaway gave a very able discourse on bacteremia and disease transmission, laying special stress upon anthrax, tuberculosis and hog cholera.

Dr. J. W. Parker presented some new ideas relative to irregular reactions to the tuberculin test. He stated that on autopsy in abattoirs 20 per cent of reacting animals showed no microscopic lesions, while, on the other hand, occasional non-reactors showed extensive lesions. His explanation of this latter condition is that progressive production of toxins in the body results in a maximum of metabolism which is not increased by the introduction of the toxins of tuberculin.

Dr. W. H. Bailey presented a paper on passive hyperthermia. Thermotaxis was ably discussed from both the physiological and pathological points of view.

Dr. J. C. Flynn reported on some of the unusual cases he had encountered in canine practice. Among these were three cases of pancreatic atrophy characterized by ravenous appetite, emaciation and the passage of a peculiar pulpy, adherent form of feces. The most unusual case, and one which the Doctor stated would probably not be believed by any of his audience, was a case of a dog whose pylorus had been obstructed by fibrous tissue, re-

sulting from a large sternal abscess, for a period of over two years. During this time the dog would eat in a normal manner but after two hours would vomit up the stomach contents. The owner stated that there had been no evacuation from the bowels for over two years, which the Doctor satisfied himself was correct, after holding the dog under close observation for several days' time. Autopsy showed the intestinal wall to be greatly atrophied and of papery consistency.

Dr. W. E. Stone reported for the Committee on Therapeutics on the intravenous use of iodine and arsenical compounds. In his hands, arsenic administered in this way has not proven efficacious in destroying circulatory parasites.

Dr. Arthur Groves gave a clear-cut description of the immunization of hogs as conducted by the B. A. I. in the Kansas City stockyards. The results of the method have been uniformly good and have proven a boon to the stock hog industry.

Papers by C. M. McFarland and C. E. Salsbery dealt with mixed infections in swine, each author giving his findings relative to the organisms present in such cases. There seemed to be a close agreement in their work, conducted entirely independently. Dr. McFarland mentioned the work of Proescher with the so-called micrococcus of hog cholera. This organism has been cultivated to the 42nd subculture and produced typical hog cholera in hogs inoculated with the 6th subculture, from which it had been repeatedly recovered, and again proved pathogenic. The authors agree that bacterial vaccines for mixed infections should contain at least 50 per cent Bacillus suisepticus, the balance being made up of the other invaders, such as colon, paratyphoid and suipestifer bacilli.

Dr. W. F. Brownlee read a well-written paper praising the results of serum and bacterial vaccines in mixed infections of swine when used with proper discrimination.

The last day's program was devoted to the problem of sheep diseases. Dr. I. E. Newsom reported on the investigations of sheep losses in Colorado, which he finds are largely due to hemorrhagic septicemia. So satisfactory has been the preventive treatment with bacterial vaccines that he recommends this procedure to those who are assembling lambs for feeding purposes. He reported on 28,833 animals in affected herds; the loss at the time of vaccination totaling 488, with 1,281 sick. The losses after vaccination were only 338. The owners in practically all cases were entirely satisfied with the results of the treatment.

Dr. E. T. Baker gave a very practical discussion of sheep diseases with appropriate means of treatment or control. He emphasized the growing importance of sheep-raising and the necessity of veterinarians familiarizing themselves with the characteristics of the different breeds and the anatomical and physiological peculiarities of these animals. He classified the various common diseases and described their treatment in an entirely practical manner, at the same time injecting considerable levity, which often put his audience in an uproar.

The banquet on the night of the 12th was largely attended, the number of ladies present being particularly commendable. Dr. N. S. Mayo served as toastmaster and called upon representatives of the Kansas City Live Stock Exchange, Stock Yards Company, B. A. I. and the Army Medical Service.

Mrs. Ashe Lockhart carried away the honors of the evening in a splendid toast, "The Veterinarian's Wife." Captain Daniel LeMay, a charter member of the association, spoke feelingly of his long experience in the regular army on the eve of his final retirement to civil life.

Dr. H. H. Silverforb had charge of the entertainment for ladies and deserves great credit for his carefully arranged program. Other members of the local arangements committee also deserve much credit for their efficiency work.

Special committees were appointed to report at the next meeting on the matter of live stock shipping regulations and the revision of our classification of swine diseases.

Resolutions were passed on the death of Dr. W. S. Nichols of Ravenna, Nebraska, the only member whose death has been reported within the past six months.

The next meeting will be held at Omaha, as usual; the time probably being early in July. R. F. Bourne, Secretary.

ASSOCIATION OF STATE AND PROVINCIAL VETERINARY COLLEGES.

The Committee on Methods of Teaching Surgery of the Association of State and Provincial Veterinary Colleges, consisting of Dr. C. A. Cary of Auburn, Alabama, Dr. H. E. Kingman of Fort Collins, Colorado, and Dr. J. N. Frost (Chairman) of Ithaca, New York, rendered the following report:

The methods of teaching surgery should be divided into five groups: first, the basic training, which leads up to surgery;

second, classroom or text-book work; third, laboratory work; fourth, clinics; fifth, experimental work.

Since pathology and anatomy constitute part of the surgeon's basic training, they relate to the subject at hand, so there should exist a direct correlation between these subjects and the subjects taught under the heading of surgery that the basic and advanced training may be cemented into a well-rounded understanding of conditions demanding surgical attention.

The basic training should be planned with the definite purpose of applying the knowledge obtained when the opportunity arrives; that is, when the student is confronted with a case for diagnosis or treatment.

It is the common experience of instructors of advanced subjects that a great deal of time must be consumed in instruction in anatomy and pathology when it should be necessary only to build upon these subjects in making a final diagnosis.

The pathology of some of the more common surgical conditions, such as fistulous withers, poll evil, laminitis, sinking of the os-pedis and hygroma of the so-called mucus bursæ, should be more thoroughly understood and taught. Too much of our pathology refers to the human and not to veterinary conditions and too much time is spent in microscopic pathology in proportion to gross or macroscopic pathology.

We believe that a course in surgical anatomy, given in the same year as the surgical instruction that the student might have the subject fresh in his mind, would be of benefit. As the practice of veterinary surgery is coming to deal more and more with other species of animal rather than the horse, the teaching of anatomy should also deal more fully with the cow, sheep, pig and dog.

The classroom or text-book work in surgery should be augmented or illustrated as far as possible by the material in the clinic or laboratory. We believe that a large part of the classroom work should be in the form of a quiz, either written or oral.

Specific operations for certain of the more important diseases of the horse are fairly well described in our text-books. There is a lack of a good text of surgical technique and also of the operations for surgical diseases of the cow, sheep and pig.

In order that a surgeon may perform a good surgical operation he must know, and be able to practice, various forms of restraint. This must include not only the restraint of the horse but of all the domestic animals. It must also include restraint

in the field as well as in the hospital. The laboratory should provide a place for the student to first learn and practice these methods.

Here also he should be taught surgical technique, including preparation of the field of operation, the use of antiseptics and the use of both general and local anesthesia. Considerable time should be spent in the teaching of the preparation, administration and uses of local anesthesia, as this is important both from a surgical and humane standpoint.

By using anesthetized subjects which are later destroyed the student may be taught to become proficient in the preparation of the field of operation, use of instruments, control of hemorrhage, and to complete those operations which he will be called upon to perform in his profession.

This not only teaches the student to use instruments and carry out the operation, but it serves to give him confidence and likewise teach him the dangers of the different operations. It is only by actual practice that these things can be learned, and we believe that these surgical exercises should include all of the domestic animals, both large and small.

After a certain amount of proficiency has been reached in the laboratory, the student may be allowed to assist in the clinic with the major operations or perform the minor ones.

The clinics are one of the most important branches in the teaching of surgery. Here it is that the student sees or assists in performing actual work. With good clinical material, the classroom work may be illustrated, which tends to fix the subject more firmly in the mind of the student.

In connection with the clinic a hospital should be maintained so that the student may be given an opportunity to follow the course of the cases which he has seen operated upon. Here he should be trained thoroughly in the preparation of the patient and the after-care and treatment, which is many times of more importance than the operation itself.

The patient should be under the direct care of the student, who, under the supervision of an instructor, is required to dress the case daily, noting the different effects of the dressing agents and watching the process of healing. It is only by understanding these things thoroughly that a student will later be able to give a reliable prognosis and instruct others in the care of his patients.

An outside or ambulatory clinic is necessary, as it is only by this means that a well-balanced course in surgery can be given. Here the student meets the conditions as he will be required to meet them in practice. And it is only by means of an ambulatory clinic that bovine surgery can be taught.

Another form of teaching that is often neglected is experimental work. A certain amount of this must necessarily be done by the instructor in order that he may keep up with the profession and by allowing the student an interest in the work he is taught to think for himself and made to realize that after graduation he still has a chance to study.

VETERINARY MEDICAL ASSOCIATION OF NEW YORK CITY.

PRESIDENT DAVID W. COCHRAN'S INAUGURAL ADDRESS.

Fellow Practitioners: Before reading to you my inaugural address I wish to call your attention to the fact that this is the twenty-fifth year of the incorporation of this association. It is fitting that some recognition will be taken of it during the year. It is the purpose of every man's life to do something worthy of the recognition and appreciation of his fellow-man. There is no accomplishment of mine of sufficient importance to have accorded me the honor which you have conferred on me by electing me President of the Veterinary Medical Association of New York City for the ensuing year. For your generosity in thus honoring me I feel most grateful. The span of man's activity is so short that many who are most worthy can not receive this honor; that you should have conferred it on me affects me profoundly. In return for your confidence it will be my pleasure to give my best energy and thought and judgment to the welfare of the V. M. A. of N. Y. C. during the ensuing year.

In an address of this kind one is at a loss to know what is timely. I have nothing new to offer and shall remain within the limits of the practical. Year after year at our meetings we see the familiar faces of faithful attendants, with a few recruits each year. Your presence proves interest in your work and the desire to take something away which will increase efficiency in the performance of your labors; if new ideas are derived as a result of this communion we shall feel that the meetings have not been in vain.

Our medical societies are our post-graduate schools and clearing houses, through which we become better informed, not only in medical matters, but in regard to our profession in general. He who keeps above the standard desires companionship; therefore, if we elevate the ethical and educational average, we increase the brotherhood of the profession and enhance the percentage of efficiency to the public. The ideal of medicine should be the stimulation of individual exertion to the highest degree and the establishment of a standard the attainment of which should be the one great desire of every member of our profession. The demands of the times are that we should level every opposition and make smooth the way for general progress, enlightement, education and the higher ethical obligations.

There will be much study, research and friendly concern shown in relation to the advancement of the profession. We in this country appreciate with deep understanding the services the profession has rendered our country and civilization at large in the course of this great war. The wonderful readiness and efficiency of the profession, the matchless courage and devotion of its members, the surprising energy and skill of the leaders in organizing the sections for war, almost over night, from a state of pacificy, are phenomena of the war deeply impressed on every veterinarian. It is our joy and pride that the profession was enabled in some degree to render such valuable service. The era of bloodshed and the smoke of battle has been followed by our triumph and self-glorification.

For the Future.

Taking my own experience and comparing it with others, when we take up the reconstruction crusade, which is the natural successor of the world war, the sudden transition from a war to a peace basis, we find every phase of our life is impatiently exclaiming "Let's go!"—commerce, industry, agriculture—all having been crowding the barrier waiting for peace to give the signal to start. We imagine the wonders of the next twelve months will be amazing enough to bewilder us all. America, borne down by the pressing weight of war, will leap upward like a spring released.

Our Patriots.

Several of our members have taken an active part in this great war and during the new year we hope to have with us at each

meeting one or more from "Over There" and to the end that they may be fittingly welcome, it will be a privilege indeed to express our joy to those who have fought so bravely and won so gloriously the intense admiration and affection of us all, and with that profound satisfaction which affects us all in the victory over which we rejoice and with which the hearts of the members overflow, to be enabled to extend to them a true and loyal welcome.

SOUTHEASTERN STATES VETERINARY MEDICAL ASSOCIATION.

The third annual meeting of the Southeastern States Veterinary Medical Association was held at Birmingham February 20-22. The association was largely attended by members, visitors and representatives of commercial houses. Some thirty new members were elected to membership. The meeting was an unusually successful one, which was highly interesting and instructive to all attending.

The association was called to order by President Dr. F. W. Morgan. In the absence of Dr. N. A. Barrett, president of the Birmingham city commission, Dr. C. A. Cary was called upon for the address of welcome, which was responded to by Dr. M. Jacob, who became aware that the Hotel Tutwiler was the best in the country upon asking the price of his room.

Dr. A. T. Kinsley gave a most interesting and instructive paper on the subject of "Infection and Immunity," which was discussed quite generally. The following points were brought out: Infection usually occurs only in susceptible damaged tissue; infection may result in physical or chemical injury, usually the latter; chemical products in the form of toxins, endo-toxins, etc., result in immunity, which may be toxic immunity, bactericidal or osonic.

Dr. E. A. Cahill followed Dr. Kinsley with another valuable and appreciated paper on "Swine Plague and Mixed Infections of Swine." Dr. Cahill believes that these troubles are specific entities and difficult or impossible of differentiating from so-called chronic cholera. Discussion of this paper was postponed till after other papers upon "Hemorrhagic Septicemia" and "Hog Cholera" had been read.

Dr. H. Jensen gave a rather full description of the symptoms and diagnostic features of hemorrhagic septicemia in cattle

Dr. A. L. Hirleman presented a paper on "Hog Cholera Control," in which he cited the more recent government findings regarding the probable exaggerated belief in the spread of cholera by such carriers as dogs, shoes of people, wagons, etc. This paper was discussed at length by Dr. H. C. Wilson. He hopes that the treatment work in cholera control will soon be turned over to the veterinarians and that only the inspection work will be left to the state and federal officials. Dr. Cahill was again called upon to repeat his differential diagnosis of cholera and other swine infections. Dr. Kinsley questioned the reference to cholera lesions and asked if cholera was not virtually a lesionless disease. Regarding control work by veterinarians and county agents, a contrast of the amount of cholera present in the states of Missouri and Nebraska was made.

In order to allow the speaker to catch an early train, Lieutenant Blasingame of the Federal Bureau of Public Health next gave an interesting paper on "Control of Venereal Disease in Man." He would encourage treatment of such disease by physicians only and prevent self-treatment and patent medicine treatment. Many drug stores had agreed not to carry such patent remedies, but corner grocery stores are often gross offenders. Even small towns should have public health clinics for all diseases, and they should not be stigmatized as venereal clinics. The control of such disease is a publicity problem and not a moral one. Lieutenant Blasingame was given a rising vote of thanks for his contribution to the program.

The discussion of hog cholera and mixed infections of swine was again resumed. Dr. Jensen doubts the existence of cholera without mixed infections. Dr. J. S. Koen finds it impossible to differentiate swine diseases either from symptoms, lesions or specific treatment. He cited some experimental treatments for several outbreaks of disease, with very confusing results. In one extensive outbreak under his observation, he was satisfied the trouble was "flu." The symptoms tallied exactly with those his physician had diagnosed in him as "flu" and he could make nothing else out of it.

Dr. F. P. Caughman led in a discussion of Dr. Jensen's paper on "Hemorrhagic Septicemia in Cattle." He related his experience with the trouble and gave the symptoms and lesions he had found. Drs. Bahnsen, Cary and Hutchens are quite sure that the "mad itch" in the South is different from that in the West and probably not a form of hemorrhagic septicemia.

Mr. I. C. Brenner gave a very entertaining talk, illustrated by views on his trip over the United States recently for the American Journal of Veterinary Medicine.

Dr. N. S. Mayo also presented a few interesting views, scenes from Cuba, with well-chosen remarks.

The influenza discussion was opened by Dr. M. J. Ragland with a few remarks regarding his experience with the British and American army horses and mules passing through the yards at Spenser, North Carolina. Dr. Kinsley stated that little definitely was known concerning influenza, but he believes there are several different entities classed as influenza. He thinks pink-eye is probably due to a filterable virus. Dr. Roberts didn't doubt the various entities, but, like in human "flu" and swine infections, believes the possibility in the majority of cases of a specific predisposing infection followed by one or more infections. Other predisposing factors, however, are quite possible at times. Dr. M. Jacob stated good results had apparently followed rigid sanitary measures in cleaning up all centers where animals were collected in sale stables and yards. One year's experience, however, is not conclusive. Drs. Piatt, Bahnsen, Staley, Bell and Morgan reported cases of suspected forage poisoning, rather than some form of influenza, but a satisfactory diagnosis could not be made.

Owing to the fullness of the program, the introduction on the program of a visit to the Ensley steel mills, and the absence of the writers of several good papers, the following papers in the hands of the Secretary had to be omitted: "Abortion Disease," by Dr. E. T. Hallman; "Anthrax and Blackleg," by Dr. A. Eichhorn; "Diagnostic Agents," by Dr. A. R. Ward. It was unfortunate that these papers could not be read, for they contained valuable information.

Dr. I. S. McAdory read a timely paper on "Wound Infections." Dr. Mayo discussed the results obtained in treating many infected wounds by the use of chlorazene and dichloramine-T. Dr. M. F. Jackson had failed to get a satisfactory sprayer for dichloramine-T, hence was still relying largely on his old standby, tincture of iodine. Dr. R. C. Moore had obtained some splendid results by continuous irrigation with very weak formaldehyde solution. Dr. Kinsley called attention to the danger of continuous irrigation unless good drainage provided, especially if there was much force to the irrigating stream.

Dr. M. Jacob made report for the Nomenclature Committee on "Black Tongue in Dogs" and recommended the substitution of "Southern Dog Plague."

On Friday morning the association assembled in front of the Hotel Tutwiler for a picture for a Birmingham evening paper.

Dr. J. S. Andrade next read a paper on "Acute Indigestion of the Horse." He recommended the use of the stomach tube, passing the same through the nostril. The paper was discussed at length by Dr. C. J. Norden, who preferred passing the tube through the mouth, after ligating the jaws and lubricating the tube with a solution of sodium thiosulphate.

Major R. M. Staley of the United States Army gave a rather detailed account of the duties of veterinarians in the various branches of the army service. Some things accomplished were much to be desired, many things were not as desired, but could have been worse. He felt that a great deal of unjust criticism of the army had been made by veterinarians both within and without the army. He reported that Dr. D. S. White had been raised to a full colonel upon the staff of General Pershing.

The following officers for the ensuing year were elected at the business session:

President—Dr. G. A. Roberts, Raleigh, North Carolina.

First Vice President—Dr. J. S. Andrade, Huntsville, Alabama.

Second Vice President—Dr. F. P. Caughman, Columbia, South Carolina.

Third Vice President—Dr. J. W. Salter, Dawson, Georgia.

Secretary-Treasurer—Dr. H. C. Hutchens, Atlanta, Georgia.

On Friday afternoon the association assembled in the rooms of the Birmingham Rotary Club, from which place we were taken in automobiles to the large Ensley steel mills. Here we were shown through the plant and observed the process of converting huge masses of red-hot steel into steel rails. The afternoon was greatly enjoyed by all.

At 7 o'clock p. m. the association assembled for its annual banquet, with Dr. A. T. Kinsley as toastmaster. Major Staley, Dr. Roberts, Dr. Jensen, Dr. Bahnsen and Dr. Hirleman responded to toasts.

Dr. D. M. Campbell presented a paper on "Reconstruction Problems Confronting the Veterinarian." The problems were so many and variable that he found it difficult to recommend specific remedies for these problems. The paper was discussed

by Dr. Tait Butler, who held that the reconstruction would necessarily be in the veterinarian posting himself upon animal husbandry subjects.

Dr. N. S. Mayo, Secretary of the American Veterinary Medical Association, enumerated the objects of the national association and urged all present to embrace the opportunity of making this the banner year for the South in new members of the A. V. M. A.

Dr. C. A. Cary discussed the arrangements for entertainment of the A. V. M. A. at New Orleans in November. He stated that Louisiana had appointed a local committee and suggested that each state in the South do its part in coöperation with the Louisiana committee. Upon motion, a steering committee, consisting of Drs. C. A. Cary (chairman), Tait Butler and Peter Bahnsen, was appointed to aid in the coöperation of the southern states with the Louisiana committee. The Mississippi State Veterinary Medical Association reported that they had recently voted $100.00 for the New Orleans meeting and would raise more by individual subscription, if wanted. Upon motion, a subscription was started among the members of the Southeastern States Association, which resulted in the raising of more than $200.00.

The Necrology Committee reported the following deaths:

Dr. T. B. Carroll, Wilmington, North Carolina; Dr. J. F. Foley, Kingston, North Carolina, and Dr. T. D. Jackson, Talladega, Alabama, charter members, and Dr. S. G. Carter, Roanoke, Alabama.

The resolutions adopted by the association included those expressing appreciation for services and hospitality shown by the local veterinarians, the Birmingham Rotary Club and the management of the steel plant at Ensley; also an expression of our indebtedness to visiting veterinarians coming from a distance and adding so much to the interest and usefulness of our program; condemning the general distribution of tuberculin and mallein, which should be placed only in the hands of qualified and legally recognized veterinarians; one relating to the B. A. I. employees, as follows:

Whereas, The Veterinarians employed by the United States Bureau of Animal Industry are rendering conspicuous and invaluable service in affording protection to public health by an efficient inspection of meat and meat food products and in the protection rendered the live stock industry by the control and eradication of animal diseases; and,

Whereas, It is a notorious fact that these faithful public servants have never received just compensation for their services; and,

Whereas, The present parsimonious salaries compel many of the most efficient to sever their connection with the Bureau, thus threatening the Service with demoralization; therefore, be it

Resolved, by the Southeastern States Veterinary Medical Association, That we endorse the Rainey amendment now pending before Congress, which provides for increased compensation; and, be it further

Resolved, That the officers of this association are hereby instructed to urge the Secretary of Agriculture and all members of Congress representing these southeastern states to actively support such measures as will secure just classification and adequate compensation for these worthy members of our profession.

The following were elected to honorary membership in the association: Drs. E. A. Cahill, J. S. Koen, R. C. Moore and Major R. M. Staley.

The association accepted the invitation to meet in Atlanta for its 1920 convention. The date of the meeting was left for the Executive Committee to fix.

An interesting and well-attended clinic was provided for the morning of the last day by Drs. Jackson, Piatt and French. The following demonstrations were given:

The technique of cryptorchid castration in the horse, by Dr. William Bell.

Chloral hydrate (intraperitoneally) anesthesia in mule, by Dr. R. C. Moore.

Stomach lavage (to be passed through nostril) of mule, by Dr. J. S. Andrade.

Intrapalpebral malleinization of mule, by Major R. M. Staley.

Intradermal tuberculinization of cow, by Dr. G. A. Roberts.

Anti-rabic immunization of dog, by Dr. D. A. Piatt.

Intraperitoneal injection of anti-hog cholera serum of hog, by Dr. G. R. White.

The third annual convention closed with expressions from all attending that a splendid successful meeting had passed into history.

G. A. Roberts, Secretary.

Dr. G. B. Munger, veterinary inspector on hog cholera control work for the B. A. I., has recently been transferred from Rock Island, Illinois, to Cedar Rapids, Iowa, where he succeeds Dr. B. H. Borman. Dr. Borman has been transferred to tuberculosis eradication work, with headquarters at Madison, Wisconsin.

COMMUNICATION.

To the Editor:

The February, 1919, issue of the Journal, on page 628, includes the caption "The Bland Reports Upon Epizootic Abortion Experiments," by W. L. Williams, and the subject matter that follows does not limit itself to a discussion of the reports.

Without commenting on the part pertaining to the discussion of the report at this time, it is timely to call attention to the concluding sentence: "No British maker of biologic products, so far as a search among advertisements in English journals reveals, offers bacterins, vaccines or other 'cures' for 'abortion'."

While the first part of the sentence may be correct, that advertisements cannot be found, the same cannot be said of the latter portion, "Offers bacterins, vaccines or other 'cures' for 'abortion'." Attached hereto is a label from an ampul, which is self-explanatory:

> BACILLUS ABORTUS VACCINE ('WELLCOME') 826/I TRADE MARK BRAND
> (For the prevention of bovine epizootic abortion)
> *Prepared and Tested at the* 5 c. c. containing **100,000** million organisms
> Wellcome Physiological Research Laboratories
> Brockwell Hall, Herne Hill, London, (Eng.) *Series:* W 208A

It is noteworthy that the product is offered for the prevention of Bovine Epizootic Abortion and not "Cures for abortion," and it does not differ in this respect from similar products of American manufacture.

Very truly yours,

H. K. MULFORD COMPANY.
JOHN REICHEL, Director.

Major Wm. V. Lusk, for over twenty years a subscriber to the Journal, has returned from France, where he was with the A. E. F., and has resumed his practice at Burlington, Vermont.

Dr. Sherman Ames has taken over the practice and is conducting the small animal hospital formerly operated by the late Dr. C. B. Palmer at Easton, Pennsylvania.

Lieutenant Harry H. Ross has received his honorable discharge from the Canadian Army Veterinary Corps and has resumed his former practice of veterinary medicine at Brandon, Manitoba.

NECROLOGICAL.

DR. J. G. HEIGHWAY.

Dr. Heighway, Ladoga, Indiana, was born September 2, 1864, died February 18, 1919. Was a graduate of the Toronto Veterinary College in 1888. A wife, two sons and two daughters survive him. He enjoyed a very extensive practice and was well known over a good portion of the State of Indiana. For many years an influential member of the Indiana State Veterinary Medical Association, always taking an active part in the discussions as well as repeatedly contributing to the literary program at the association's meetings, we will all feel this great loss.

G. H. R.

DR. F. E. BURNHAM.

Frank E. Burnham, D. V. S., died at his home, 1415 John Avenue, Superior, Wisconsin, February 17, 1919. He had been confined to his bed since November, 1918. The Doctor was born in Independence, Iowa, in 1860 and came to Superior immediately after his graduation from the Chicago Veterinary College in 1890. He had practiced there continuously until November, 1918, when he was forced to retire on account of poor health, being one of the oldest settlers at the Head of the Lakes. He was the first City Veterinarian to be appointed by the City of Superior and had held this office until his death. Dr. Burnham was also a Deputy State Veterinarian.

In 1899 he joined the A. V. M. A. and was also a member of the Wisconsin Veterinary Medical Association, the Knights of Pythias and the Superior Commercial Club. He was a man of great personality, high ideals and sterling character, taking a wonderful pride in his chosen profession, and beloved by all who knew him. A wife and daughter mourn his loss. R. D.

DR. JAMES LEWIS.

The following resolutions were adopted by the Mississippi State Veterinary Medical Association:

The vacancy at this meeting and the absence of that familiar voice we have so often heard reminds us that fitting respect for

the distinguished dead impels us to place on record some memorial of his labors, some token of our esteem and regret.

It is always sad and sorrowful to witness the removal of our dear ones from this earth. The bitter pangs of anguish linger a long while and only through the mercy and loving kindness of God can we find relief.

The subject of this tribute, Dr. James Lewis, died at McKinney, Texas, in January, 1919. He was a graduate of the Chicago Veterinary College and had resided for the past seven years at Greenwood, Mississippi, where he had a lucrative practice. He was for many years an honored member of this association. It is the friendship of such a character as dear Dr. Lewis that makes life worth living. We loved him in life and we respect his memory now that he is dead. He was faithful to our association, just to his fellow man. He always held high the lofty ideals which should characterize the conduct of a veterinarian.

> The night dew that falls, though in silence it weeps,
> Shall brighten with verdure the grave where you sleep.
> And the tear we shed, though in secret it rolls,
> Shall long keep your memory green in our souls.

Of the service of this distinguished son of Texas some enduring memorial should be made. Therefore, be it

Resolved, by the members of the Mississippi State Veterinary Medical Association, That these resolutions be spread upon the Journal as a mark of the esteem in which this body held the late deceased and as a token of our reverence for his memory. And that a copy be sent to the family.

DR. FREDERICK W. HUNTINGTON.

Dr. Frederick W. Huntington died at the Maine General Hospital, Portland, Maine, January 23, 1919. He was born in Monmouth, Maine, February 8, 1857, and was graduated from the American Veterinary College, New York City, in 1883. After graduation he began active veterinary practice in Portland, and was appointed as a local veterinary inspector in the Bureau of Animal Industry January 1, 1892. He has been in continuous service of the bureau at the port of Portland since appointment, and for 27 years has had charge of meat inspection; Canadian import and export inspection; and interstate inspection of cattle and horses. J. R. M.

DR. J. D. DURACK.

Dr. J. D. Durack, for twenty-five years a practicing veterinarian at Geneseo, Illinois, was struck by a fast train on January 27 at a crossing in Geneseo, and instantly killed, the deceased's view being obstructed by a string of box cars.

Dr. Durack was born in Sheffield, Illinois, March 6, 1867, and was graduated from the Chicago Veterinary College with the class of 1893. He was appointed Assistant State Veterinarian by Dr. Dyson in 1914. The Doctor leaves a widow, two young sons and a legion of friends. G. B. M.

REVIEWS.

A TEXT-BOOK ON GENERAL BACTERIOLOGY.

By Edwin O. Jordan, Ph.D. Professor of Bacteriology in the University of Chicago and in the Rush Medical College. Sixth edition thoroughly revised. Octavo of 691 pages, fully illustrated. Philadelphia and London: W. B. Saunders Company, 1918. Cloth, $3.75 net.

The success of Jordan's Text-Book of General Bacteriology is assured from the fact that the sixth edition has followed the fifth in two years. The sixth edition contains but 22 pages more than the fifth, which has kept the revised edition within a space that can be covered by the student. The more important changes that have been made are the rewriting of the chapter on the pneumococcus and a careful revision of that on the meningococcus, together with brief summaries of the present knowledge of infectious jaundice, rat bite fever and trench fever. Numerous minor changes, corrections and additions have been made.

The subject of bacteriology is one that the author of this book believes should find a place in every general scientific course. It is of special professional interest to medical and veterinary students, but the subject also has a direct technical bearing on household administration, agriculture, sanitation and sanitary engineering and to various industries and technological pursuits. For the general scientific student and reader, bacteriology presents certain aspects that tend to widen the outlook upon a variety of human interests. While there is considerable overlapping in the subject of bacteriology as applied to these different subjects, the essential matter is quite different in each. The scientifically trained person needs for his general understanding of many of the phenomena of nature, including health and dis-

ease, a somewhat broad knowledge of microörganisms—what they are, where they are and what they do.

The author of this book teaches bacteriology to university students in scientific courses and to medical students and consequently it would be expected that the volume is designed for the use of students in such courses. As Dr. Jordan is a distinguished epidemiologist, it naturally follows that the greater part of the description of species is devoted to those microörganisms causing human infections and epidemics. There are, however, in addition to these strictly medical phases of the subject, interesting instructive chapters on higher bacteria and protozoa pathogenic for man; filterable virus; bacteria of milk and milk products; nitrifying bacteria; bacteria in the arts and industries; bacteria of air, soil and water; and bacterial diseases of plants.

The chapters that are perhaps the most noteworthy for their excellence in explaining difficult technical subjects are those on the structure and mode of development of bacteria; composition of bacteria; the effect of physical and chemical agents upon bacteria; and the effect produced by bacterial growth. The other chapters on classification and general bacterial technique are good.

The organic structure of the book is commendable. In style it is clear and the space devoted to the various topics is well proportioned. In selecting data from the voluminous literature the author has exercised a delicate discrimination and presented only that which seems to be of the most importance. There are numerous references to the literature which add to its value. The text illustrations, of which there are 177, are excellent.

There are several minor points on which opinions may differ as to the interpretation of phenomena and in a few instances slight changes suggest themselves. However, these are in connection with topics that are as yet more or less controversial. As the author is a research worker of authority and a teacher of high standing, the text, as well as the subject matter, is admirably adapted to the needs of students. It is difficult to suggest how a greater number of important bacteriological facts could be more fully or concisely presented. For medical students or for those wishing a knowledge of the role bacteria play in nature's economy, this volume is to be highly recommended.

The publishers have done their part in a very acceptable manner.

V. A. M.

MISCELLANEOUS.

HELP NEEDED.

The following letter was received recently by a member of the American Veterinary Medical Association:

"I have been kinder forced to do some veterinary practice for years in our 'Out of the way' country, but have never been licensed, but I expect to soon take the examination and I herein enclose some 'Quizs' sent me by the secretary of the State Board. As I haven't made any study of veterinary sciences beyond Arecoline (and Arecoline has certainly done some marvelous acts for me) I am going to enclose the Quizs and request you to fill them out for me and I shall send you my check for your charges. Of course, I feel quite sure that you will not charge me unreasonably for this assistance."

History doth not record this request as having been granted.

HEADS DEPARTMENT OF VETERINARY MEDICINE.

Dr. Ralf R. Dykstra, for eight years a member of the faculty of the Kansas State Agricultural College, is now head of the Department of Veterinary Medicine. His appointment to fill this position, vacant for some time, has just been announced.

Dr. Dykstra is one of the leaders in his field of study in the United States, and in addition is a very successful executive. For the year 1917-1918 he was president of the Kansas Veterinary Medical Association. He is also active in local affairs in Manhattan. He is vice president of the Chamber of Commerce and a member of its board of directors. He is prominent in Masonic work.

Born in the Netherlands, Dr. Dykstra came to this country with his parents when only two years old and spent his boyhood in Iowa. He attended the Iowa State College, receiving the degree of doctor of veterinary medicine in 1905. Immediately upon his graduation he was made Assistant Professor in his alma mater and remained at that institution for six years, being Professor of Anatomy at the time of his resignation.

After a few months spent in the service of the Bureau of Animal Industry, United States Department of Agriculture, Dr. Dykstra came to the Kansas State Agricultural College. His work here has been principally in the field of surgery, and has been highly successful in practical surgical work.—*The Kansas Industrialist.*

(The Journal heartily congratulates Dr. Dykstra on his well-earned promotion.

OKLAHOMA NOTES.

Lieutenant W. P. Shuler has been honorably discharged from military service and is opening an office in Oklahoma City. He is specializing on the treatment of sterility in valuable animals, of which there appear to be quite a number among the high-priced cattle in this state.

Dr. J. E. Nance, formerly with the Agricultural and Mechanical College at Stillwater, has a monopoly on the hog vaccinating business at the Oklahoma City stock yards and is doing a good business. He is also an extensive dealer in Airedale dogs.

Dr. L. J. Allen, inspector in charge of tick eradication, is recovering from a severe attack of influenza.

Lieutenant C. E. Steele, who has been with the Army Veterinary Corps for over a year, has returned to Oklahoma City and opened an office in the location formerly occupied by Dr. J. M. Vrba, deceased.

Dr. E. V. Robinette has been appointed State Veterinarian and is being kept quite busy. He is making a drive on tuberculosis, which appears to be quite prevalent among the dairy cows which are being shipped in from the northern states.

Dr. H. A. Roscoe, formerly with the B. A. I., has secured a much more lucrative position with the Western Weighing Association at the stock yards. He makes post-mortem examinations on all stock which is found dead in the railroad cars and the data which he furnishes is of great assistance to the transportation companies in passing on claims for losses.

Drs. F. C. Pryor of Wewoka and D. W. Gerber of Oklahoma City have been appointed members of the State Board of Veterinary Examiners.

The Legislature has passed a bill providing for the testing of all cattle which are suspected of being tubercular and reimburs-

ing the owners for their losses on condemned stock. It also authorizes the establishment of segregated herds of tubercular cattle where the breeding value of the cattle will justify such action. The act provides for the appointment of four Deputy State Veterinarians at a salary of $2,100 per year. The latter provision was secured as the result of the work of a committee from the state association, viz: J. S. Grove, Oklahoma City, W. H. Martin, El Reno, and C. R. Walter, Tulsa.

Dr. W. C. Drake of the B. A. I. has been appointed as inspector in charge of tuberculosis eradication in this state and he has already located quite a number of diseased herds.

About 12,000 dairy cattle have been brought into the state in the last year and they are furnishing plenty of business. Henceforth all dairy and breeding stock coming into the state will be quarantined until released by the state or coöperating federal veterinarians.

J. S. Grove,
Resident State Secretary.

THE HARRISON ACT.

The Harrison Act, as amended by the new war revenue act, will be mailed postpaid to any druggist, physician, dentist or veterinarian who will send a postal request therefor to "Mailing Department, Parke, Davis & Co., Detroit, Michigan." Please observe directions strictly.

THE RELIEF OF RASTUS.

Here is a little story that was told by Congressman James B. Cantrill of Kentucky when the conversation in a Washington club turned to the handicaps of the aged.

Recently a bull on a big country estate became so unsafe that it was found necessary to send for a veterinary surgeon and have him dehorned. As the veterinarian was leaving after having removed the dangerous weapons of Taurus he met an old colored man shuffling along the driveway.

"I sure am glad, doctah," said Rastus, with a look of great relief, "dat yo' hab done gone an' chopped de ho'ns offen dat bull."

"Why do you say that, Rastus?" smiled the veterinarian.

"It am jes' dis way, Doctah," rejoined the colored man, "I'se too old ter climb trees and I'se too young ter die."—Philadelphia Telegraph.

The Henryetta, Oklahoma, Chamber of Commerce invites some veterinarian to locate in that city of 30,000 inhabitants and large mining interests.

The Bridgeport, Connecticut, Board of Health is about to establish the position of Meat Inspector for that thriving city. Veterinarians are invited to consider the proposition.

Dr. S. E. Weber of Lancaster, Pennsylvania, was a visitor to New York in February incident to placing his plans to control odors, etc., in rendering plants, and the sterilizing of hospital rooms and other buildings.

Legislation in the New York Legislature contemplates reopening registration to non-graduates. Increasing the taxes on bitches to ten dollars. Enlarging the power of the Department of Farms and Markets to extend the control of bovine tuberculosis and the establishment of accredited herds. A state milk commission to control the production and sale of milk and all milk products. To treble the damages to be collected from dog owners whose dogs kill sheep.

A New England reunion of all the graduates of the several veterinary schools of New York City now united under the New York State Veterinary College at New York University will be held in Boston, Massachusetts, on the fourth Wednesday in April.

The Journal begs to acknowledge with thanks the announcement of the wedding of Miss Edna Eleanor Biddison of Tulsa, Oklahoma, to Dr. John Wallace Lumb of Sioux City, Iowa, which happy event took place on Saturday, February 22, 1919. The Journal wishes the young couple long life. happiness and prosperity.

Dr. Russell A. Runnells, formerly of the Veterinary Training School at Camp Lee, Virginia, has accepted an appointment as Assistant in Animal Pathology at the Michigan Agricultural College, East Lansing, Michigan.

Lieutenant James W. Benner, who was stationed at Camp Greenleaf, has received his discharge and returned to his position as Assistant Professor of Veterinary Medicine at the Michigan Agricultural College, East Lansing, Michigan.

DR. WINCHESTER ADDRESSES BOARD OF HEALTH.

According to the Lawrence (Massachusetts) Sun American, Dr. J. F. Winchester addressed the board of health and told how House Bill 1151 relative to the inspection of all cattle for slaughtering after being reported favorably to the house by the committee on public health received a solar plexus knockout on the floor of the legislature and asked that the state board or the governor be communicated with in an effort to reopen the case.

Dr. Sullivan said it was lamentable and a sad commentary upon the intelligence of the legislature of Massachusetts to see them kill measures of this kind, and in the face of the tremendous amount of time and money that is being spent in an effort to prevent the spread of tuberculosis. "It is a pity that the inmates of these public institutions are compelled to eat meats that have not undergone the proper inspection," said the doctor.

It was voted to have the chairman of the board of health and Dr. John F. Winchester, cattle inspector, communicate with the state board and the governor on the matter.

At the meeting of the health board the American Health Association invited the local health board to become affiliated with that organization. The invitation was accepted, and the members voted to connect up with that health association.

The following is a copy of House Bill 1151 above referred to:

AN ACT

Relative to the Slaughtering of Neat Cattle, Sheep or Swine.

Section one hundred and five of chapter seventy-five of the Revised Laws, as amended by section two of chapter three hunderd and twelve of the acts of the year nineteen hundred and two, by section two of chapter two hundred and twenty of the acts of the year nineteen hundred and three, by section six of chapter three hundred and twenty-nine of the acts of the year nineteen hundred and eight, by section two of chapter two hundred and forty-eight of the acts of the year nineteen hundred and twelve, and by chapter one hundred and thirty-nine of the acts of the year nineteen hundred and sixteen is hereby further amended by striking out the words "intended for sale",—so that said section will read as follows:—

Section 105. The provisions of the six preceding sections shall not apply to a person not engaged in such business, who, upon his own premises and not in a slaughter house, slaughters his own neat cattle, sheep or swine, but the carcass of any such animals shall be inspected, and, unless condemned, shall be stamped or branded according to the provisions of section one hundred and three of chapter seventy-five of the Revised Laws, as set forth in chapter two hundred and twenty of the acts of the year nineteen hundred and three, and as amended by chapter four hundred and seventy-one of the acts of the year nineteen hundred and nine and by section five of chapter two hundred and ninety-seven of the acts of the year nineteen hundred and eleven, by an inspector at the time of slaughter.

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A KNOWLEDGE OF LIFE HISTORIES IMPORTANT.

There is perhaps nothing that has furthered the progress of modern medicine more than a knowledge of the life histories of the causal organisms of contagious diseases, as well as the higher parasites, and their obligatory hosts, and other carriers.

What gross ignorance prevailed at one time with regard to malaria, for instance, when it was considered that some miasmatic influence was the sole cause, medical men not being aware at the time that locations where "miasma" was presumed to exist furnished the breeding places for certain mosquitoes *(anopheles)* which, from an after-study of their life histories, were found to be obligatory hosts of the *Plasmodium malariae,* the protozoal parasite responsible for the disease, and that after feeding upon the blood of a malarial patient, were capable of transmitting the parasite to a healthy person. Malaria was, therefore, found to be possible of control, and in some cases of total eradication, either by destruction of the insect-hosts, the mosquitoes, or by preventing their coming in contact with infected and healthy subjects.

Or, in the case of yellow fever, that scourge of the tropics and of the southern section of our own country. All sorts of

ideas prevailed among physicians as to its cause and transmission until a study of the life history of the secondary host, the *Stegomyia calopus,* was undertaken and worked out to a final conclusion.

Previously, many carriers of the infection were suggested, such as *fomites,* or clothing and merchandise of different kinds in transit from one place to another, as well as people from the infected areas.

All of this ignorance led to shotgun-quarantines being imposed in many places, and the general stoppage of communication. However, the knowledge obtained from a study of the life history of the special mosquito solved the problem for all time; and by destruction of the insect-host of the virus, yellow fever has become a thing of the past in sections where it formerly was a dreaded human scourge.

We have also a very prominent illustration in the case of *Bovine piroplasmosis,* or so-called Texas fever, which played such havoc among the cattle stocks of the country until the protozoan causing the fever was discovered in the blood, and the life history of the *Margaropus annulatus,* or common cattle tick of North America, was worked out and found to be an obligatory host of the specific organism, the *Piroplasma bigeminum.* Like malaria and yellow fever, the destruction of the tick, or secondary host of the protozoan, means the total elimination of this infection from the United States, and the saving of millions of dollars to the cattle interests of the country; and all from a working knowledge of the life history of the cattle tick in its connection with this disease. And it should not be forgotten that the work done on the protozoan of Texas fever and the life history of its obligatory host, the tick, suggested the possibility of malaria and yellow fever being insect-borne diseases, and their eradication through the elimination of the insects which harbored their viruses during a part of their development.

We might allude, also, to the value of a working knowledge of the life histories of the higher forms of two-host parasites, such as the various tapes, which infest both man and the lower animals; and of others, also, which do not require two individuals, as hosts, in order to complete their development, such as the different nematode worms which are often so destructive to our farm animals.

A working knowledge, or the absence of it, along such lines may frequently mean the difference between success and failure

on the part of the veterinarian when called upon to deal with parasitism in animals, whether bacterial, or that higher up the scale of parasitic life.

By this we do not mean that the practicing veterinarian is called upon, nor has he the time, to work out life histories, such as we have alluded to; but for his own information and benefit, he ought to avail himself of the data obtained by those who are making a special study in this particular line of investigation, of which a great deal has already been published, as knowledge of this phase of the practice of veterinary medicine is decidedly important, and is becoming more and more so every day.

GREAT INCREASE IN LIVE STOCK THROUGH CONSERVATION AND ELIMINATION OF DISEASE.

The last year of the great war witnessed a combined effort on the part of those concerned in live stock production that brought forth unparalleled results in the matter of supplying the world need for meats and fats at a most critical time. It may be recalled how in 1917, especially after the entrance of the United States into the war, the American people were enjoined to save food in every way possible, while the American farmer was urged to increase the production of foodstuffs and food animals to the limit of his capacity. How well this was done may be judged from official figures recently published by the United States Department of Agriculture.

First there is the department's estimate of our live stock resources on January 1, 1919, the numbers of which are here shown in comparison with the corresponding figures for the preceding year:

	Jan. 1, 1919	Jan. 1, 1918	Increase
Horses	21,534,000	21,555,000	*21,000
Mules	4,925,000	4,873,000	52,000
Milk cows	23,467,000	23,310,000	157,000
Other cattle	44,399,000	44,112,000	287,000
Sheep	49,863,000	48,603,000	1,260,000
Swine	75,587,000	70,978,000	4,609,000

*Decrease.

Another way of showing the increased production is by means of the slaughter records compiled in the Bureau of Animal Industry. In these estimates, in which the animals slaughtered are reduced to a dressed-meat basis, it is shown that the total production of dressed meat, including lard of swine, during the calendar year

1918 was 20,129,820,000 pounds, as against 16,317,280,000 pounds for 1917. The increase in a single year, therefore, was 3,812,540,000 pounds or 23.4 per cent. This vitally important contribution to the world deficiency in meats and fats not only fully met all the export requirements but left a large surplus for the home consumption as well.

Such a stupendous result naturally was brought about by means of many and diversified agencies, ranging from the government through the state and county official workers down to the individual farmer. Never before has the value of coöperative work been so strongly evidenced. Certainly the result could not have been accomplished except through carefully organized teamwork all along the line.

Although eminently satisfactory, however, the good work must by no means be halted because of the coming of peace. In a recent review of the agricultural situation, the Secretary of Agriculture has advised maintaining the number of horses and mules without material increase; a normal increase in the number of dairy cows and beef cattle; a conservative policy with respect to increasing the number of swine until the relative shortage and high price of feeds is overcome; and an increase in sheep consistent with facilities for feeding and pasturage and the farmer's skill in handling them.

Attention may appropriately be called to the part played by the veterinary profession in this great food-production campaign. The veterinarian's work may not be of a spectacular nature, but it is of no little importance in respect both to the public health and to the health and well-being of the country's live stock. In the first place, about 67 per cent of all the animals slaughtered for food in the United States passes the federal inspection, which is supervised by the veterinary staff of the Bureau of Animal Industry in charge of that service. In addition, special details of inspectors have been stationed at the various army camps and naval stations throughout the country (over 100 places in all) to safeguard the health of the military and naval forces from contaminated meat and other food products. During the fiscal year 1918 more than 300,000,000 pounds of products were inspected in this work.

Turning now to the conservation of farm stock and the eradication of animal diseases, the enormously enhanced value of farm animals nowadays has made their conservation and health a matter of much greater concern to the owners than was formerly

the case. Hence the veterinary work connected with the control of animal diseases and the prevention of losses therefrom has become increasingly important.

The eradication of the cattle tick in the South has been pressed most vigorously and successfully during the last few years. It can now be safely predicted that this destructive pest will be entirely eliminated within a few years.

That most widely distributed menace to the live stock industry, tuberculosis, has recently been made a special object of attack by the Bureau of Animal Industry. Coöperative work with the state authorities, live stock associations, and individual owners on a practically nation-wide scale has accomplished most flattering results in the short time the work has been in progress. At last reports about 500 pure-bred and 1,100 grade herds have passed the requisite tests and become fully "accredited" as free from tuberculosis. There are 165 Bureau veterinarians engaged in this line of work alone, and the various coöperating states employ about an equal number.

The control of hog cholera is proceeding on a vast scale, and such animal plagues as influenza of horses, scabies of sheep and cattle, blackleg, anthrax, contagious abortion, dourine, hemorrhagic septicemia, plant poisoning and other causes which operate to reduce live stock production continue to call forth vigilance and prompt service on the part of the veterinary forces of the country.

J. R. M.

Public auction sales of surplus army horses and mules conducted by the remount division up to March brought a total of $11,414,997 to the government for 96,548 animals. These sales were held at thirty-six camps, cantonments and stations throughout the United States, and the average price obtained was $118 an animal. A total of 53,142 horses was disposed of, divided as follows: cavalry and riding horses, 26,245; light artillery horses, 26,550, and heavy artillery horses, 337. The 43,406 mules sold were classed as follows: wheel mules, 11,260; lead mules, 26,213, and pack and riding mules, 5,933. Auction sales of army horses and mules will be continued until the entire surplus has been sold.

It is the intention of the Division of Veterinary Medicine, Iowa State College, at Ames, to hold a practitioners' course this year during the week beginning June 23.

INVESTIGATIONS TO DETERMINE THE CAUSE OF CERTAIN SHEEP DISEASES IN COLORADO.*

G. H. GLOVER, I. E. NEWSOM, E. W. ALKIRE,
Fort Collins, Colorado.

(Concluded from Page 22)

LOT NO. 21.

Consisting of 200 pregnant ewes in excellent condition of flesh. Been kept in Denver yards most of the winter. Shipped to Weskan, Kansas, on March 6, 1918, where they arrived the following day and were driven 15 miles to a ranch. By the 10th several were noticeably sick. They were visited on the 15th. They were quite fat and several had already lambed. Nine had died, four of which had been lost the night previously. Between 40 and 50 were noticeably sick. Some 15 were down and could not rise. The others were breathing audibly, were dull, with heads down, and were not eating. Some few had their heads turned to one side, as though there were cerebral disturbances. Two of the dead ones were examined, each carried two fetuses. Both showed a few subcutaneous hemorrhages and the lymph glands, particularly the prescapular, were much reddened and hemorrhagic. Mucous membrane of the trachea and bronchial tubes was injected. There were subpleural hemorrhages in the lung tissue, but no pneumonic areas. Subpleural hemorrhages were numerous under the costal and diaphragmatic pleura. Hemorrhages were very numerous under the epicardium, especially at the auriculo-ventricular groove. A few hemorrhages were noticeable under the capsule of the spleen. The liver showed reddened areas throughout its surface. The fourth stomach was extremely reddened throughout, as were also certain areas in the intestines. Lungs and heart from one of these animals were brought to the laboratory, where direct cultures were made from the heart blood, and a rabbit was inoculated intravenously with 1 c.c. of a suspension of the heart blood worked up in distilled water. A sheep was given 10 c.c. intravenously of the same material. The rabbit remained healthy. Nothing definite was obtained from the direct cultures.

* Presented at 55th Annual Meeting, A. V. M. A., Philadelphia, 1918.

The record of the sheep was as follows:

March 17, 1918—Temperature, 105.2. Not eating.

March 18, 1918—Temperature, 105.4. Had eaten a little.

March 19, 1918—Temperature, 106.2. Not eating.

March 20, 1918—Temperature, 104. Not eating.

March 21, 1918—Temperature, 103.8. Eating some.

March 22, 1918—Temperature, 104.2.

March 23, 1918—Temperature, 104.

March 24, 1918—Temperature, 104.4.

Sheep remained healthy.

Lot No. 24.

Consisting of 2,950 head near New Castle, Colorado. There had been a loss of something over 300 head at the time of our visit. Feed was plentiful and the ewes were in excellent condition. The weather had been rainy. History was that they would get down and lie in a comatose state for many days, followed by death. Some showed cerebral symptoms, but few died quickly. At least five were posted which showed practically no lesions whatever. Finally one was found that had died soon after showing symptoms. There was considerable tracheitis and bronchitis. A filling of the lower portion of the apical and cardiac lobes, a few subpleural hemorrhages and many subepicardial ones. Stomach and intestines appeared normal. No laboratory work was done on this outbreak. The animals were later sent to the range, with very little further loss, although they were not vaccinated.

Lot No. 25.

Consisting of 1,000 head near Brush. These ewes were shipped in October. During December, five were lost with pneumonia, after which there was no further loss until March. During March, some 60 head had died. These were visited by the State Veterinarian and the local veterinarian, who made a diagnosis of hemorrhagic septicemia and recommended vaccination. Vaccination was carried out on March 26. They were seen by us on April 3, at which time five had been lost since vaccination. The owner believed the band showed remarkable improvement.

Lot No. 26.

Consisting of 66 ewes and 32 young lambs in the vicinity of Monte Vista. The owner reported that two of the ewes and three of the lambs had been lost. One of the small lambs was

posted by the local veterinarian, who described the following lesions: Many of the lymph glands were swollen and red. There was considerable tracheitis, some pneumonia, subpleural hemorrhages, a few hemorrhages at the base of the heart, and some on the bladder. This place was visited by us on April 8, 1918, at which time it was quite noticeable that nearly all of the young lambs were showing signs of illness. There was a muco-purulent discharge from the eyes and nose, in some instances the eyes being glued together. The lambs acted somewhat depressed. No post-mortem was obtained at this time. All of the 32 lambs, which varied in age from two days to a month, were vaccinated with a vaccine furnished by one of the local veterinarians. This place was visited again on May 13, at which time the owner had lost eight of the vaccinated lambs and was losing several more that had been born since the previous visit. One was posted that had died the night before. There was noticed a hemorrhagic tracheitis and bronchitis, with pneumonic areas in the lower portion of the anterior lobes of the lungs. A few subepicardial hemorrhages were present. Practically all lymph glands examined were swollen, red and hemorrhagic. The lungs and heart of this lamb were brought to the laboratory for further examination.

On arrival at the laboratory a rabbit was given intravenously 1 c.c. of heart blood emulsion at 2 p. m. Cultures were made direct from the heart blood. By the following morning the rabbit was found dead, cultures from which showed the typical bipolar organisms. To determine the virulence of this latter culture on May 27 a rabbit was given 1 c.c. of the 24-hour bouillon culture. The rabbit was found dead in the cage the next morning. Smears and cultures showed the usual bipolar organism.

On May 30, a sheep was given 15 c.c. of a 24-hour bouillon culture of the former culture intravenously at 11:30 a. m. At 9 a. m. the following morning the sheep was found dead. Cultures made from the heart blood showed the typical bipolar organism. A rabbit was destroyed with 1 c.c. of the heart blood of this sheep in less than 24 hours. Cultures from the rabbit showing the same organism.

Post-mortem on this sheep revealed the following: There were many hemorrhages in the subcutaneous and intramuscular fasciæ. The precrural, submaxillary, prescapular, popliteal and superficial inguinal lymph glands were hemorrhagic. The mucous membrane of the larynx and trachea was filled with hemor-

rhages, varying from petechiæ to ecchymoses. There was 600 c.c. of straw-colored fluid in the pleural cavity. Subpleural hemorrhages along the intercostal arteries were numerous. The lungs were studded with hemorrhages. There were a few petechiæ on the left auricle. The spleen showed several subcapsular hemorrhages. Sublumbar lymph glands were hemorrhagic. Kidneys showed marked congestion, but no hemorrhages. The mucous membrane of the fourth stomach and the first few inches of the duodenum were hemorrhagic. The leaves of the abomasum were slightly reddened. Some areas of the small intestines showed enteritis. The vessels of the pia-mater were slightly injected.

Lot No. 27.

Consisting of some 1,000 ewes, nearly all of which had sucking lambs. They were visited by us on May 7, 1918, at which time the owner stated that he had lost over 100 ewes, after which the ewes stopped dying and the sucking lambs began. He did not know how many lambs he had lost, but thought there were a great many. At the time of our visit, there were two lambs dead in the pens and four down in a comatose state. One noticeable symptom was that the heads were turned back, giving the appearance of a cerebral disturbance. These four lambs were brought to the laboratory. One died on the evening of the 7th, with the following post-mortem: The lymph glands were swollen and hemorrhagic. Pericardium filled with fluid. There were petechial hemorrhages of the heart and lungs, and a marked inflammation of the trachea. Cultures were made from the heart blood and one rabbit was inoculated with 1 c.c. of the pericardial exudate, given intravenously. An experimental sheep was given 10 c.c. of the pericardial exudate intravenously. The inoculated sheep never showed signs of illness. The rabbit died during the night of the 9th. Cultures from the heart blood of the inoculated rabbit showed a small bipolar organism, but it was contaminated with another organism, so that it was finally lost. A second rabbit inoculated from the first remained healthy. The three lambs lived for varying periods of time, lying in a comatose state, one living for six days.

Lot No. 30.

Consisting of 1,100 ewes in the vicinity of Del Norte. There had been a loss of approximately 100 since March 1, 40 of which had died in the last 30 days. Owner had also lost about 75

lambs. There was one sick ewe and one recently dead lamb found for examination. The post on the ewe is recorded as follows: She was slaughtered for the examination. There were gelatinous exudates present over the sternum and side of the neck. A few subcutaneous hemorrhages of the petechial type. The prepectoral and submaxillary lymph glands were hemorrhagic. The lungs showed congestion of one lobe and numerous petechial spots. Pericardium showed the presence of considerable gelatinous exudate. There were numerous subepicardial hemorrhages. A considerable amount of straw-colored fluid was present in the abdomen. The omentum was gelatinous, while the peritoneum over the kidneys was hemorrhagic. There were some hemorrhages on the uterus. The lamb showed some congestion of the lungs, submaxillary lymph glands, kidneys and brain. The lungs and heart of the ewe were brought to the laboratory, where, on June 17, a rabbit was inoculated intravenously with 1 c.c. of lung emulsion and another with 1 c.c. of heart blood emulsion. The rabbit given the heart blood emulsion showed no signs of illness. The one inoculated with the lung substance was found dead on the 15th. Bipolar organisms were found in smears from the heart blood of this rabbit and also in the pure cultures obtained from it.

DISCUSSION.

It is seen from the above series of cases that a gram negative bipolar organism has been isolated from certain pregnant ewes in typical outbreaks of what has been variously termed preparturient eclampsia or preparturient paralysis.

It has been possible by using these cultures and by using lung and heart blood emulsions from the affected ewes to reproduce what appears to be a similar condition in healthy nonpregnant sheep from which the original organism has been isolated. This has been done not once but several times. In fact, so frequently as to give the assurance that these cultures can be depended upon in proper dosage to produce death in sheep of various ages. It is true that in some instances inoculation and cultural results have proven negative, but this does not seem to us surprising. A recent happening will illustrate our views in this matter. A rather severe outbreak of chicken cholera occurred in the vicinity of the Station. One hen was brought to the laboratory by the owners. Smears made from the blood from any part of the body showed the presence of large numbers of

bipolar organisms. The place was immediately visited and two sick chickens, a rooster and hen, were brought back. The rooster died within two hours of arrival at the Station. Smears made from the blood anywhere in the body showed large numbers of bipolar organisms. The hen survived until some time the next day, when she died. Being in need of some smears for class work, one of our assistants made 50 smears from this hen. After he had finished the work and had them well stained, he examined one of them to be sure that his work was satisfactory. Not a single organism could we find in any of the smears, although there is every reason to believe that the hen died from the same malady that was affecting the other two. The inference I draw from this is that under certain conditions the organisms may be readily demonstrated in the blood of sheep, whereas we may find a few hours later they have left the blood stream entirely, and it is quite possible in some instances cannot be discovered in any of the body tissues. This is the way, then, in which we account for our negative results. Possibly also our technique has not always been of the best, and as it is developed we may find more positive results. We, therefore, believe from our experience thus far that this bipolar organism has a rather definite relation to the cases in pregnant ewes as above outlined. It will be noted in the later cases described, particularly in Lots 26 and 27, that the disease appeared to begin in the old ewes and then spread to the suckling lambs. From these lambs, it has also been possible to isolate what appears to be a bipolar organism of the same species as that isolated from the ewes, and which on injection has not only killed rabbits, but sheep with typical symptoms of hemorrhagic septicemia.

ANIMALS DESTROYED BY INOCULATION FROM OUTBREAKS.

Lot No. 3. November 29, 1916. A guinea pig was inoculated intraperitoneally with heart blood of a dead sheep. A rabbit was inoculated from the pleural exudate of the same animal. Both died the night of November 30. Smears and culture from these experimental animals revealed a small bipolar organism.

Lot No. 10. Lung emulsion was introduced intraperitoneally into a rabbit. Inoculated October 23 and died October 27, 1917. Smears from the rabbit showed bipolar organisms. Rabbit inoculated intravenously with 2 c.c. lung emulsion November 7, found dead November 12. Smears showed bipolar organisms.

Lot No. 11. Rabbit inoculated with lung emulsion on November 10. Died night of November 12. Smears and cultures showed bipolar organisms.

Lot No. 13. Rabbit inoculated November 27 with lung emulsion. Died November 30. Smears showed small bipolar bacilli.

Lot No. 14. Rabbit inoculated with suspension of heart muscle November 27. Died December 2. Smears showed small bipolar organisms.

Lot No. 18. An emulsion was made from the heart blood and lung tissue in boiled water. One c.c. of this material was given intraperitoneally to a guinea pig. The same amount to a rabbit and 10 c.c. was given intravenously into a sheep on March 2, 1918. All three animals were dead by the next morning. Smears and cultures from all these animals showed typical bipolar organisms. The sheep showed the following on post-mortem examination:

Many subcutaneous hemorrhages, both prescapular lymph glands deeply reddened and hemorrhagic. Mucous membrane of the trachea and bronchial tubes was deeply reddened. A few subpleural hemorrhages in the lung tissue and many along either side of the spine in the intracostal space and also above the sternum. The heart near the auriculo-ventricular groove was studded with hemorrhages. The fourth stomach was deeply reddened throughout its mucous membrane, as was also the first few inches of the duodenum. The kidneys were congested. There were a few small hemorrhages on the outer surface of the bladder.

From the above sheep 2 c.c. of heart blood was given a rabbit intravenously March 3, 1918. Rabbit died March 8, 1918.

Lot No. 19. Emulsion of lung tissue and heart blood in boiled water administered intraperitoneally in 1 c.c. dosage to one guinea pig and one rabbit, and subcutaneously to one rabbit on March 2, 1918. Ten c.c. of the same material given intravenously to a sheep. The rabbit and guinea pig which were inoculated intraperitoneally were found dead the next day. The rabbit inoculated subcutaneously died the second day after inoculation. The record of the inoculated sheep is detailed under Lot 19, previously described.

Lot No. 26. May 15, 1918. Rabbit inoculated with 1 c.c. of heart blood emulsion at 2 p. m. Found dead the following morning.

Lot No. 27. May 8, 1918. Rabbit inoculated with 1 c.c. pericardial exudate intravenously. Found dead May 10, 1918.

Lot No 30. June 11, 1918. Rabbit inoculated intravenously with 1 c.c lung emulsion. Found dead June 15, 1918.

SUMMARY.

ANIMALS DESTROYED BY DIRECT INOCULATION FROM OUTBREAKS.

Lot No. and Source		Amount and Animal		Method of Administration and Time Till Death
3	Heart blood.........	1 c.c.	Guinea pig......	Intraperitoneal, 24 hrs.
3	Pleural exudate.....	1 c.c.	Rabbit..........	Intraperitoneal, 24 hrs.
10	Lung emulsion......	1 c.c.	Rabbit..........	Intraperitoneal, 4 days.
10	Lung emulsion......	2 c.c.	Rabbit..........	Intravenous, 5 days.
11	Lung emulsion......	1 c.c.	Rabbit..........	Intraperitoneal, 2 days.
13	Lung emulsion......	1 c.c.	Rabbit..........	Intraperitoneal, 3 days.
14	Heart muscle........	1 c.c.	Rabbit..........	Subcutaneous, 5 days.
18	Heart blood and lung	1 c.c.	Guinea pig......	Intraperitoneal, 24 hrs.
18	Heart blood and lung	1 c.c.	Rabbit..........	Intraperitoneal, 24 hrs.
18	Heart blood and lung	10 c.c.	Sheep...........	Intravenous, 24 hrs.
19	Heart blood and lung	1 c.c.	Guinea pig......	Intraperitoneal, 24 hrs.
19	Heart blood and lung	1 c.c.	Rabbit..........	Intraperitoneal, 24 hrs.
19	Heart blood and lung	1 c.c.	Rabbit..........	Subcutaneous, 2 days.
19	Heart blood and lung	10 c.c.	Sheep...........	Intravenous, 10 days.
26	Heart blood.........	1 c.c.	Rabbit..........	Intravenous, 24 hrs.
27	Pericardial exudate..	1 c.c.	Rabbit..........	Intravenous, 2 days.
30	Lung emulsion......	1 c.c.	Rabbit..........	Intravenous, 4 days.

Animals destroyed by direct inoculation: guinea pigs, 3; rabbits, 12; sheep, 2.

CULTURES OF *B. OVISEPTICUS* ISOLATED FROM OUTBREAKS.

Lot No. 3. Cultures made direct from the heart blood and pleural fluid of dead sheep on November 29, 1916. Cultures were made from the guinea pig and a rabbit inoculated November 29, 1916, and died the night of November 30.

Lot No. 10. Cultures made from rabbit inoculated November 7, 1917, and found dead November 12, 1917.

Lot No. 11. Cultures made from rabbit inoculated November 10, and died November 12. Cultures made from heart blood of sheep January 15, 1918.

Lot No. 18. Cultures from a rabbit, guinea pig and sheep inoculated March 2, found dead March 3, 1918. Also from a rabbit inoculated with 2 c.c. of heart blood from the above experimental sheep. Died March 8, 1918.

Lot No. 19. Cultures from two rabbits and one guinea pig. Inoculated March 2. Died March 3 and 4. All showed bipolar organisms. Labeled Colt Rabbit No. 1, Colt Rabbit No. 2, and Colt Guinea Pig.

Lot No. 26. Culture made direct from heart blood of lamb. Culture made from rabbit inoculated with heart blood of above lamb May 15, 1918, found dead May 16, 1918.

Lot No. 27. Culture made direct from heart blood May 5, 1918, and from rabbit inoculated May 8, 1918, and died May 10, 1918. Both cultures found later to be contaminated and never isolated.

Lot No. 30. Culture made from rabbit inoculated with lung emulsion June 11, 1918, and found dead June 15, 1918.

CULTURES OF *B. OVISEPTICUS* ISOLATED FROM OUTBREAKS.

Lot No. 3. Heart blood affected sheep.
Lot No. 3. Pleural exudate affected sheep.
Lot No. 10. Inoculated rabbit.
Lot No. 11. Inoculated rabbit.
Lot No. 11. Heart blood affected sheep.
Lot No. 18. Inoculated guinea pig.
Lot No. 18. Inoculated rabbit.
Lot No. 18. Inoculated sheep.
Lot No. 19. Inoculated guinea pig.
Lot No. 19. Inoculated rabbit.
Lot No. 26. Heart blood of lamb.
Lot No. 26. Inoculated rabbit. Contaminated.
Lot No. 27. Heart blood of sheep. Contaminated.
Lot No. 30. Inoculated rabbit.
Number of outbreaks from which cultures were isolated, 8.

EXPERIMENTS TO SHOW VIRULENCE OF CULTURES.

March 7, 1918. Source of culture: made from the heart blood of a rabbit that had been inoculated with lung and heart emulsion of a sheep in outbreak No. 18. The rabbit had died within 12 hours after inoculation. Culture known as Lee rabbit.

Two c.c. of bouillon culture which had been transferred under date of March 3, 1918, was given intravenously to a rabbit at 3:30 p. m. Also 1 c.c. from the same source to a guinea pig intracardially.

March 8, 1918, at 8 o'clock a. m., both guinea pig and rabbit were found dead. Cultures were obtained from both of these and labeled Lee culture rabbit No. 1 and Lee culture guinea pig No. 1.

March 8, 1918. Source of culture: heart blood of sheep that

had received 10 c.c. of an emulsion of lung and heart blood taken from a sheep in outbreak No. 18. Thirteen c.c. of a culture which had been transferred March 7, 1918, and grown at 37°C., was given intrajugularly at 9:30 a. m. to two lambs, weight about 60 pounds. At 3:30 p. m. one of the lambs was rather dull and showed a temperature of 104.2. No. 2 was much excited, running from side to side of the pen. There was some hemorrhage from the nose. Temperature, 104.4, at 5 p. m.

March 9, 1918. 8:30 a. m., No. 1, temperature 102.8; No. 2, temperature 105.2; No. 3, temperature 104.3. 9:00 a. m., No. 3, temperature 103.2. 12:00 m., No. 3, temperature 104.2. 4:00 p. m., No. 1, temperature, 104.2; No. 2, temperature 103.4; No. 3, temperature 106.4. Lamb No. 3 was inoculated intrajugularly with 30 c.c. of the bouillon culture.

March 10, 1918. 8:30 a. m., No. 1, temperature 103, no appetite, appears dull; No. 2, temperature 103.1, no appetite and appears dull; No. 3, temperature 101.8, very dull, no appetite, almost too weak to stand, muco-purulent discharge from both nostrils streaked with blood. 5:45 p. m., No. 1, temperature 106.3, not eating, dull; No. 2, temperature 104, not eating, dull; No. 3, temperature 103.8, not eating, lying down, refuses to eat, hemorrhages from nostrils.

March 11, 1918. 8:30 a. m., No. 1, temperature 102.4, dull and not eating; No. 2, temperature 103.8, dull, not eating; No. 3, temperature 103.1, dull, not eating, lies down continuously, can rise when assisted, but lies down again immediately, breathing labored. 1:45 p. m., No. 3 found dead in the pen with the following post-mortem examination: There were no subcutaneous hemorrhages. The post-pharyngeal, submaxillary and popliteal lymph glands were red, swollen and hemorrhagic. The prescapular glands were normal. The mucous membrane of the larynx and trachea was deeply reddened and hemorrhagic. The lungs show hemorrhagic areas along the lower border of the left apical and cardiac lobes. The lower half of these lobes was filled. There were numerous subpleural hemorrhages, especially along the spine, but many were also present under the costal pleura. There was a small amount of fibrinous exudate on the pleura. The heart showed numerous petechial hemorrhages in the vicinity of the auriculo-ventricular groove. The liver showed a considerable number of reddened areas under the capsule, apparently due to a hemorrhage. The spleen appeared normal. The kidneys were congested. The bladder showed many small hemorrhages

in its outer coat. The stomachs appeared normal, but the duodenum and at least two feet of the small intestine showed a deep reddening throughout the mucous coat. 4:45 p. m., No. 1, temperature 103.8, not eating; No. 2, temperature 104.1, not eating.

March 12, 1918. 8:30 a. m., No. 1, temperature 102.4, eating a little; No. 2, temperature 104.5, not eating.

March 13, 1918. 8:30 a. m., No. 1, temperature 105.3, eating, appears lively; No. 2, temperature 105.2, dull, not eating, at times holds head to one side and moves in a circle. 4:00 p. m., No. 1, temperature 104; No. 2, temperature 105.7.

March 14, 1918. 10:00 a. m., No. 1, temperature 102.6; No. 2, temperature, 104.6. 4:30 p. m., No. 1, temperature 104; No. 2, temperature 105.4.

March 15, 1918. 9:00 a. m., No. 1, temperature 103.5; No. 2, temperature 104.6.

March 16, 1918. 10:00 a. m., No. 1, temperature, 103; No. 2, temperature 104.6.

March 18, 1918. 9:00 a. m., No. 1, temperature 101.8; No. 2, temperature 102.8.

March 19, 1918. 9:00 a. m., No. 1, temperature 102.4; No. 2, temperature 105, dull, not eating.

March 20, 1918. No. 1, temperature 102.6; No. 2, temperature 106, dull.

March 21, 1918. 2:00 p. m., No. 1, temperature 102.4 (this animal survived and no further records are given). No. 2, dead. Post-mortem is as follows: There were numerous subcutaneous hemorrhages. The post-pharyngeal, prescapular and mediastinal lymph glands were hemorrhagic. The trachea and larynx were congested and hemorrhagic. The lungs showed numerous subpleural hemorrhages. The apical lobe of the right one showing some solidification. There were hemorrhages beneath the costal pleura. The heart showed numerous hemorrhages of the petechial type, especially along the auriculo-ventricular groove and some on the auricle. The gastric and mucous membrane were intensively reddened, but the intestinal mucous membrane was normal. The kidneys showed petechial hemorrhages. Spleen slightly enlarged. Liver somewhat enlarged and firm. Cultures made direct from the heart blood showed cocci and were discarded. A rabbit inoculated from the heart blood remained healthy.

March 13, 1918. 3:00 p. m., large healthy lamb having temperature 102.6 was given intravenously 30 c.c. of a bouillon culture which had been made from heart blood of sheep No. 3.

March 14, 1918. 10:00 a. m., animal showed a temperature of 105.6, associated with dyspnœa and hemorrhages from the rectum. 4:30, temperature 103.3.

March 15, 1918. Sheep found dead. Post-mortem is as follows: The animal had been dead only a short time. There were no subcutaneous hemorrhages. The lymph glands appeared normal. The larynx normal. Trachea showed hemorrhagic areas and it was filled with bloody froth. There were many subpleural hemorrhages of the petechial type. These were very numerous over both lung surfaces, but also occurred beneath the costal pleura. A few petechial hemorrhages over the auricle of the heart.

March 13, 1918. A rabbit was given 1 c.c. of the same culture which was used on the above sheep.

March 14, 1918. 10:00 a. m., rabbit dead. Bipolar organisms were recovered in pure culture from this rabbit.

March 16, 1918. One c.c. of a bouillon culture isolated from above rabbit and dated March 27, 1918, was inoculated intraperitoneally into a guinea pig.

April 17, 1918. Pig dead. Culture from heart blood revealed bipolar organisms in pure culture. One c.c. of this was inoculated April 18, 1918, intravenously into a rabbit. Rabbit dead following morning.

April 19, 1918. Pure culture of a bipolar organism was obtained from the heart blood of this rabbit and carried as Lee culture rabbit No. 3.

May 2, 1918. Four rabbits, averaging 550 grams in weight, were given the following amounts of a bouillon culture obtained from Lee culture rabbit No. 3: No. 1, ¼ c.c.; No. 2, 1/10 c.c.; No. 3, 1/50 c.c.; No. 4, 1/100 c.c. All injections were made in the posterior auricular vein except No. 4, where the vein was missed, and the injection given subcutaneously.

May 3, 1918. All four rabbits dead.

May 3, 1918. Four rabbits given intravenous injections of Lee culture rabbit No. 3 as follows: No. 1, 1/100 c.c.; No. 2, 1/500 c.c.; No. 3, 1/1000 c.c.; No. 4, 1/10,000 c.c. Injections made at 5:00 p. m.

May 4, 1918. 9. a. m., all four rabbits found dead.

May 7, 1918. Four rabbits given intravenously the following amount of a bouillon culture labeled Lee culture rabbits No. 3: No. 1, 1/10,000 c.c.; No. 2, 1/100,000 c.c.; No. 3, 1/1,000,000 c.c.; No. 4, 1/10,000,000 c.c.

May 18, 1918. 9:00 a. m., No. 1 and No. 2 dead in cage, No. 3 very dull, No. 4 slightly indisposed. 10:00 a. m., No. 3 dead and No. 4 quite sick. 3:00 p. m., No. 4 eating some. No. 4 remained well. From this experiment we judge that the minimum lethal dose for a rabbit of the size used was 1/1,000,000 of a c.c. of a bouillon culture.

May 7, 1918. Four yearling sheep were selected for this determination. Temperatures taken and given the following doses of same bouillon culture as used on sheep Lot No. 3: No. 1, temperature 103.6, given 1/10 c.c.; No. 2, temperature 104.2, given 1 c.c.; No. 3, temperature 103.8, given 5 c.c.; No. 4, temperature 104.8, given 10 c.c.

May 8, 1918. Found sheep in following condition: No. 1, temperature 106.7, lame and appears sick; No. 2, temperature 106.2, lame and appears sick; No. 3, temperature 107, appears bright and O. K.; No. 4, temperature 105.6, very sick and shows discharge from nose. Stands quietly with head down. It is strongly suspected that No 3 is immune, having previously received a dose of a less virulent culture.

May 9, 1918. Sheep all alive and up. Nos. 1, 2 and 4 lame, Nos. 1 and 2 in front quarters and No. 4 in hind quarters. No. 3 apparently O. K. Temperatures at 10:00 a. m. as follows: No. 1, 105; No. 2, 104.8; No. 3, 106.2; No. 4, 103.

May 11, 1918. 10:00 a. m., No. 4 showed considerable discharge from nose, Nos. 1 and 2 lying down and not eating, No. 4 not eating. No. 1, temperature 104; No. 2, temperature 104; No. 3, temperature 103.

May 13, 1918. 10:00 a. m., No. 1, temperature 104.2, discharge from nose, very rapid respiration, stiff and lame; No. 2, temperature 104.9, somewhat lame but otherwise appears about normal; No. 3, lively; No. 4, temperature 104.5, very weak and unable to rise, head held to one side, profuse discharge from nose, eyes closed.

May 14, 1918. Nos. 1 and 2 seem a little better, No. 3 still lively, No. 4 very sick, same symptoms as yesterday.

May 15, 1918. No. 1, temperature 104.9; No. 2, temperature 105.2, No. 4, temperature 106, discharge from nose.

May 16, 1918. No. 1, temperature 104; No. 2, temperature 105; No. 3, O. K.; No. 4, dead. Post-mortem shows pneumonia, petechial hemorrhages on heart. Stomach and duodenum were congested. Lymph glands very hemorrhagic. Numerous hemorrhages in subcutaneous tissue. Spleen and liver normal. Showed

hemorrhages from rectum. Had profuse discharge from nose four days before death. Cultures made from heart blood.

May 17, 1918. Cultures made from heart blood of No. 4 shows a very mixed infection. Large numbers of different cultures being present in cultures. No. 1, temperature 104; No. 2, temperature 105, very lame; No. 3, lively, O. K.

May 18, 1918. No. 1, temperature 103.9, eating; No. 2, temperature 104.1, same as yesterday; No. 3, lively and O. K.

May 20, 1918. No. 1, eating a little; No. 2, not eating, very lame; No. 3, lively and O. K.

May 28, 1918. No. 1, eating and O. K. but somewhat lame; No. 2, seems to be O. K.; No. 3, O. K.

June 24, 1918. No. 2 always remained thin and carries left hind leg. No. 1 still lame in right front leg, knee seems enlarged.

SHEEP NO. 4, LOT NO. 2.

May 30, 1918. Sheep given intravenous injection of 15 c.c. of 24 hour bouillon culture of Monte Vista culture at 11:30 a. m.

May 31, 1918. Sheep found dead in pen at 9:00 a. m. Had evidently been dead some time. Cultures made and rabbit given intravenous injections of 1 c.c. heart blood emulsion.

June 1, 1918. Rabbit found dead. Smears from heart blood show large numbers of bipolar organisms. Cultures made and labeled Monte Vista No. 2.

POST-MORTEM ON EXPERIMENTAL SHEEP NO. 4.

May 31, 1918. Subcutaneous hemorrhages. Precural, submaxillary, prescapular lymph glands extensively reddened and hemorrhagic. Outer muscular fasciæ, especially in region of shoulder and neck, studded with large hemorrhages. Popliteal lymph glands; one normal and one hemorrhagic. Superficial inguinal hemorrhagic. Larynx and trachea covered with extravasations varying from petechiæ to ecchymoses, hemorrhages. Straw-colored fluid pleural cavity 300 c.c. one side L., 300 c.c. on right side.

Subpleural hemorrhages along intercostal arteries. Lungs studded with petechial hemorrhages. Diaphragm normal. Spleen shows several subcapsular hemorrhages of ecchymotic type. Sublumbar lymph glands slightly hemorrhagic. Bladder empty. Slightly reddened mucous membrane. Liver, several subcapsular hemorrhages, particularly on cardiac lobe. Small amount of fluid in peritoneal cavity.

Fibrinous adhesions of apical and cardiac lobes to costal pleura. Few petechiæ on left auricle. Subcutaneous extravasations of blood throughout trachea. Mucous membrane of fourth stomach deeply reddened throughout. First few inches of duodenum reddened and hemorrhagic. Leaves of abomasum slightly reddened. Mesenteric lymph glands normal. Some areas of small intestine show enteritis. Vessels of pia-mater highly injected.

LOT NO. 3, SHEEP NO. 5.

June 6, 1918. One sheep given 15 c.c. Colt Rabbit No. 2 culture (bouillon) at 11:30 a. m. Temperature at time of injection 104.8. 2:00 p. m., temperature 106, respiration rapid, down. 5:00 p. m., still down, sluggish and somewhat bloated, temperature 104.

June 7, 1918. 9:00 a. m. Found dead, cold, evidently died early in night.

Post-mortem: Frothy discharge at nostrils. No subcutaneous hemorrhages. Precrural lymph glands normal. Submaxillary and prescapular lymph glands deeply reddened and hemorrhagic. Few subpleural hemorrhages in lower thorax on one side and large number on other side. Some fluid in thoracic cavity. Thymus hemorrhagic. Heart extremely hemorrhagic. Trachea and bronchi show extreme diffuse hemorrhages throughout. Liver reddened with hemorrhages, particularly at upper (Lot. 3, Sheep 5) Notebook. Ecchymotic subserous hemorrhages in small intestines. Kidney extremely ecchymotic. Sublumbar lymph glands hemorrhagic. Subcapsular hemorrhages on spleen. Fourth stomach normal. Few hemorrhages in mucous membrane. Hemorrhages in connective tissue around trachea. Larynx hemorrhagic. Rabbit injected with 1 c.c. of blood from axillary A at 9:30 a. m. Cultures made and labeled Colt culture Sheep No. 1. Cultures from heart blood.

VIRULENCE OF CULTURES.

GUINEA PIGS.

Source	Pig No.	Amount Used	Method of Entrance	Time Till Death
Lot 18	1	1 c.c.	Intracardial	18 hours
Rabbit No. 2	2	1 c.c.	Intraperitoneal	24 hours

RABBITS.

Source	Rabbit No.	Amount Used	Method of Entrance	Time Till Death
Lot 18	1	2 c.c.	Intravenous	18 hours
Sheep No. 3	2	1 c.c.	Intravenous	24 hours
Pig No. 2	3	1 c.c.	Intravenous	24 hours
Rabbit No. 3	4	1/4 c.c.	Intravenous	24 hours
Rabbit No. 3	5	1/10 c.c.	Intravenous	24 hours
Rabbit No. 3	6	1/50 c.c.	Intravenous	24 hours
Rabbit No. 3	7	1/100 c.c.	Subcutaneous	24 hours
Rabbit No. 3	8	1/100 c.c.	Intravenous	24 hours
Rabbit No. 3	9	1/500 c.c.	Intravenous	24 hours
Rabbit No. 3	10	1/1,000 c.c.	Intravenous	24 hours
Rabbit No. 3	11	1/10,000 c.c.	Intravenous	24 hours
Rabbit No. 3	12	1/10,000 c.c.	Intravenous	24 hours
Rabbit No. 3	13	1/100,000 c.c.	Intravenous	24 hours
Rabbit No. 3	14	1/1,000,000 c.c.	Intravenous	24 hours
Rabbit No. 3	15	1/10,000,000 c.c.	Intravenous	Lived
Lot 26	16	1 c.c.	Intravenous	24 hours
Lot 19	17	1 c.c.	Intravenous	24 hours
Lot 19	18	1 c.c.	Intravenous	24 hours
Lot 26	19	1 c.c.	Intravenous	24 hours

SHEEP.

Source	Sheep No.	Amount Used	Method of Entrance	Time Till Death
Lot 18	1	13 c.c.	Intravenous	Lived
Lot 18	2	13 c.c.	Intravenous	13 days
Lot 18	3	30 c.c.	Intravenous	2 days
Sheep No. 3	4	30 c.c.	Intravenous	2 days
Lot 19	5	1/10 c.c.	Intravenous	Lived
Lot 19	6	1 c.c.	Intravenous	Lived
Lot 19	7	5 c.c.	Intravenous	Lived
Lot 19	8	10 c.c.	Intravenous	9 days
Lot 19	9	15 c.c.	Intravenous	12 hours
Lot 26	10	15 c.c.	Intravenous	24 hours
Rabbit No. 3	11	5 c.c.	Intravenous	24 hours
Rabbit No. 3	12	5 c.c.	Intravenous	12 days
Rabbit No. 3	13	5 c.c.	Intravenous	Lived
Rabbit No. 3	14	10 c.c.	Intravenous	24 hours
Rabbit No. 3	15	1 c.c.	Intravenous	11 days
Rabbit No. 3	16	5 c.c.	Intravenous	6 days

Guinea pigs, 2; rabbits, 18; sheep, 11.

4:44 p. m. Rabbit found dead in cage. Cultures made and labeled Colt Rabbit No. 3.

May 27, 1918. Source of culture, Rabbit No. 3. Rabbit given 1 c.c. of 24 hour bouillon culture. Found dead next morning.

Source of culture, Lot 26. Rabbit given 1 c.c. of 24 hour bouillon culture. Dead the next morning.

May 28, 1918. Source of culture, Outbreak 19. Rabbit given 1 c.c. of 24 hour bouillon culture. Found dead next morning.

VACCINATION.

Since our early findings several thousand sheep have been vaccinated within the State. We give here merely a record of those vaccinated either directly under our supervision or following our visit to the premises. Altogether, we have to record 13,481 vaccinations, 505 of which were sick at the time and 550 of which had been lost. The records following vaccination show a loss of 131. This from a lot of fourteen different bands. While these records appear to be satisfactory, yet there is still a question in our minds as to the real value of this procedure, as we also have records of a number of bands that were not vaccinated and yet the disease stopped. In other instances, however, where vaccination was refused, the disease progressed and took a large per-

centage of the animals. We are carrying on some experiments now to determine the actual value of vaccination under experimental conditions. In some instances it appears to be necessary to repeat the vaccination, especially where the losses have not stopped within a week following the first administration.

RECORD OF VACCINATION.

Date	Number Vaccinated	Number Sick at Time	Number Died Previously	Number Died After
November 10, 1917	504	40	50	4
November 13, 1917	771	20	20	2
November 30-December 8, 1917	4,500	10	49	4
December 21, 1918	1,100	200	40	22
March 5, 1918	1,301	6	46	35
March 24, 1918 (revaccinated)	287	...	...	...
March 5, 1918	425	7	40	18
March 19, 1918 (revaccinated)	235	4	...	4
March 5, 1918	486	4	16	2
March 26, 1918	1,000	75	70	5
March 27, 1918	525	23	12	2
April 5, 1918	652	100	*	25
May 22, 1918	45	2	2	1
May 23, 1918	100	4	25	1
June 8, 1918	900	8	170	5
June 10, 1918	650	2	10	1
Total	13,481	505	550	131

* Several.

DISCUSSION ON DR. NEWSOM'S PAPER.

Dr. Sims: I believe we have had all the conditions Dr. Newsom described there, in the extreme northwest. We have found a bipolar organism in a few cases—not quite so often as he has. Where the vaccine was not within reach we have changed conditions by changing the feeding ground and watering. It would take five days to get the vaccine to them, and we would advise them to change the feeding places and watering places; and in a good many instances the trouble has disappeared before the vaccine was injected.

Most of our veterinarians, I believe, agree that it was due to lack of exercise, and to overfeeding; and through exercising we have controlled this trouble in most instances, driving the sheep from one to three miles each day. And the reports are that it has controlled in the majority of these outbreaks, although in a few

cases it did not. We found it was the fattest that died in most instances.

Perhaps our trouble with pregnant ewes is somewhat different from what Dr. Newsom finds, because he says he has had lambs die from the same outbreak. Our veterinarians appreciate very much Dr. Newsom's work. It has been a great help within the last three years.

THE TREND OF VETERINARY EDUCATION.*

W. HORACE HOSKINS, New York, N. Y.

Reciprocity is needed and becomes more so every year and we can find a solution for it; there is no question about that in my mind.

It must be for better government and through the civil service commission of our government and this association joining with the Department of Agriculture and the army, which shall constitute a board who shall prepare suitable questions and a form of examination to determine the qualifications of members of the profession and when they pass this examination under the auspices of this association they will give them a certificate showing they have passed the examination. The examination, I hope, shall admit any member of the profession to the federal services; with the exception of the additional examination required for entrance into the army veterinary service or any other civil positions that come within the province of the veterinarian in any other department of our government.

It will give them a status that will never be obtained in any other way, and then we can go into the state legislatures and ask them to accept this certificate in lieu of an examination. That is perfectly plausible and can be carried out and I am hoping that I may live long enough to take that matter up with Congress in Washington, and all it will require is an additional appropriation for the civil service commission to carry it out. We have no standard of recognition in Europe and here we have just as many standards as there are state boards and just as many standards as colleges. We have large private colleges and state colleges, and so without any further remarks I feel this can be carried out and is the only solution of the reciprocity that will ever solve the difficulty.

*Presented at Section of Veterinary Faculties and Examining Boards, 55th Annual Meeting, A. V. M. A., Philadelphia, 1918.

The state board standards are constantly changing. A few years ago in one of the states there was a complete political upheaval. Five men were swept out because they were not of the same political affiliation, five other men were placed on the board because of their political faith, the same faith as the party that had come into power. Thus were installed five men who had been educated twenty-five years ago and they were asking questions from text-books of twenty-five years ago and the graduates all failed simply because they were asking questions these young men did not know anything about, and they will repeat this constantly until we have the power in another way by submitting or modifying our legislative act, by submitting to the state government a number of names.

We have had a governor say that it is the prerogative of the governor and he is capable of selecting his own candidates.

The trend of state colleges for some time has not been fruitful with the best possible results and the continued actions of the parent association under which we live and exist has not always been conducive to the very best results. There has been the constant trend of the American Veterinary Medical Association to drive out of existence the private schools. Still there were some things to be gained by driving some private schools out of existence, while with others there were likely to be great losses incident to attempting to do so. In the history of veterinary education in this country the story of private schools shows a wonderful work. So long as the veterinarian is not supported by the federal government we must realize that veterinary education is a state problem. If states will not support us then we must have private schools and we ought not to be unmindful in this connection of the fact that for more than thirty years seventy per cent of the members of this association have been graduates of private schools. We have had good private schools and some poor ones, because state schools are always dependent upon the liberality of the state administration in furnishing funds for their maintenance. One of the great trends of state institutions is that invariably they are located in small inland towns and associated with an agricultural school in some isolated community. We have good schools but no great schools in inland towns, and it will take thirty or forty years to attain same for the very reason that the teaching staff must be given adequate salary such as would be a living salary for their maintenance from year to year. No state has been generous enough to give liberal

salaries sufficient to make our state schools as strong as they ought to be, and when the veterinary association required there should be five veterinarians on the teaching staff, some of the schools were compelled to take two or three men with nominal pay and nominal connection and add them to their faculty, while one or two were paid full salaries. The great problems are not all in the agricultural districts and the great schools are destined to be those so located that they can command part of the time of a large number of men who are specialists by virtue of years of experience, years of training and years of observation. If you are going to get them in the inland towns you must pay them larger salaries than any state has been willing to give for the teaching staff and when you take them into the inland towns you take them away from the everyday problems and thereby lessen their value as teachers. In large cities it is possible to get a large number of men for a comparatively small total amount. You cannot use more than twenty or twenty-five men on your teaching staff because you cannot give them more than one or two hours and I would rather have men teaching that are in everyday contact with the problems to solve in practice than the men in small inland towns forced to spend their time in laboratories or libraries. It is possible to get these men in the city school. In New York we have such assistants and they are contributing part of their services, and a school of that kind can be maintained for less than in the inland town, where the majority of the teaching staff must be given adequate salaries to keep them the entire year. The larger problem is the animal food problem and the relation of animal diseases to man; also the great problem of feeding large masses of people in great metropolitan districts. We must be able to feed and clothe the people in metropolitan districts or we have not solved their problems properly.

The relation of animal diseases to man is seen more in the large cities than in the inland towns. The trend of state schools has been to get away from the old apprenticeship system and the best system will link the apprenticeship with the necessary laboratory instruction before they will turn out a fully rounded veterinarian.

The increased requirements of high school education have not been all that has been talked about and is not today furnishing us the best class of students. The boys who come out after four years of high school work, of 18 or 19 years of age, have no

knowledge of animal industry, animal husbandry, and no knowledge of normal animal life, and therefore they are far less fitted than those referred to in another address of the president's—those who come from the forge and from the farm—had a valuable equipment when they came.

The state schools cannot keep up the old apprenticeship system. The trend of the state schools is to give a man one line of instruction and one man's conception of the subject. I would rather have veterinary students get three or four men's points of view because I am sure it will develop a thinking man and not one with an ego tendency thinking that the way they have been taught is the only way. Legislatures have not realized what veterinary medicine means. The public has no idea of our intimate relation with mankind extending from infancy to old age; until the public gets the conception that the food they eat, whether it be meat, or milk; the shoes they wear, or the wool in clothing is dependent upon veterinary education—not until we get the public to see that vision will we get these state colleges properly supported. I believe the large cities offer the best opportunities for conducting great veterinary schools.

Another factor of state schools—they are never accompanied by that same loyalty you will find in men of the old private schools. Men very often went back to private schools for post-graduate work. Their sons went there also with that feeling of loyalty and devotion that you cannot get by simply paying salaries. The trend is for state schools to offer a man $500 more, or, as seen in Dakota, a man was taken down in Nebraska to do experimental work by the offer of more salary. This is particularly true of state schools in inland towns. Private schools are due to exist in the large cities for years to come through the loyalty and devotion of men connected with the schools both as their trustees and teaching bodies.

DISCUSSION.

Captain F. C. Waite: I ask for information. In Dr. Hoskins' introduction it might not be known to all of you that this same question of reciprocity on the Federal Examining Board has been before the medical profession for many years, and they have finally found a half-way solution which seems, at least to me, to be found in a national examining board. It does not have certificates because certificates have no value except when an examining board chooses to accept them. The laws of many of

the states at the present time prohibit that and specify a man can get a license to practice medicine after taking an examination; other states are already accepting these certificates and issuing licenses upon them. Gradually the states are coming in so that this privilege is being extended. The army, navy and public health service accept those certificates. The board is made up of representatives of the medical profession from representatives of the government of the different bureaus. At present it is supported financially by grant extending over a term of years. The examining board is giving examinations four times per year, at each examination an additional number coming up to be recognized as the standard—high standard of the country—if a man has a certificate from the national examining board, not a federal board, a private thing made up from civil life and government.

Dr. Glennon: Mr. Chairman, in reply to Dr. Hoskins, it being up to the governor as to whom he would select, that was true even in our state until the last session of the legislature. Now the governor has the appointment of one member out of three that are recommended to him by the Veterinary Medical Association of New Jersey. I think that is a step in the right direction.

Dr. Rogers: I had the privilege of being for ten years a member of the New Jersey State Board. We had, I think, a very good board and we did very good work. There was one peculiarity about it as far as my inquiry goes—we had an inordinate number—in other words, we felt it to be our duty to be always looking for an opportunity to let the chap go through. If you are ever going to get the best values you must fix it in such fashion that when a man goes up for a license to practice, to pass that examination they have a standard, and a proper standard, and if he does not pass it there must be no kick coming. As now constituted the principal function of the state board is to O. K. him.

Dr. E. L. Quitman: I want to express my sentiments as coinciding with every word stated by Dr. Hoskins, and in view of the possibilities or the great trend growing in the veterinary profession and furthermore the possible dearth within the next year or two, I think his remarks should be given serious consideration by members of the state colleges, by the American Veterinary Medical Association, by the Bureau of Animal Industry, and last, but by no means least, the army. I am quite sure that

nearly every member of the state colleges feels in his heart that Dr. Hoskins spoke the truth. They may not admit it, but they cannot help but see and know that it is a correct picture of conditions. In my opinion, too radical a change is going to bring about such a dearth of veterinarians that the country will in a couple of years be overrun with quacks, and instead of being a step in advance may be many steps in the retrograde direction. There is such a thing as eating more than one can digest and biting off more than one can chew, and I am very much afraid we are confronting such a condition at the present time.

Dr. C. H. Stange: I represent one state college. I got the impression from Dr. Hoskins that private institutions did more and better training than the state does by spending three or four times the same amount of money in giving a man a professional education. I cannot see how that can be done. If the public cannot furnish more money for better education than the standard of the present time at the private veterinary or medical college, with food to pay for, I am very much mistaken. I want to tell the men who are assembled here that a medical education, either in human or veterinary profession, is one of the most expensive educations anybody can get at the present time, not only on account of the faculties that must be maintained but on account of the equipment necessary. Also I want to call your attention to the fact that especially since the motor trucks have come into the large cities a very large percentage of the graduates of veterinary colleges, either private or state, are practicing in rural communities. The big problems are not in the cities but in the communities where the food animals are being produced. It is during the process of production and getting ready for market that the infectious diseases are found. In our state we lost 28,000,000 swine in one year from infectious diseases and still the author of the paper would have you believe the problems are much greater in the cities. There is, in my mind, no comparison. You are going to talk about sanitation and preventive medicine—I want to invite the author or speakers to come to the studied conditions of facts. Because, as I get it, if I am correct in my deduction from his speech, he does not understand the condition we are in for the whole community where a large part of these food products come.

As far as educating men at a state college in small cities, I believe we can educate veterinarians for these rural provinces to handle the question—aside from preventing disease among

live stock—to more advantage when we have them under those conditions than in any city in which I have been. In a great many of the state institutions at the present time men are required to go out and do practical work before they graduate. The objection to a state college was raised that the students and faculty do not get city practice. I want to say the big problems in disease controlled work in this country are in the agricultural districts and we can train them better in those districts than any big city.

Dr. Glennon: I have given this problem thought from an active country practice. In my judgment, the gentleman who just sat down has made quite a common mistake. The arguments advanced cannot be refuted but the premises he assumes are in a large degree incorrect. When I send my boy to get a veterinary education what do I want for that boy? I want his education to be well rounded. I want him to be equally familiar with the pathology and therapeutics of all animals. I want him to do what I have been able to do, to do my own surgery, to do my own pathological work. I want him to be familiar with the conformation of the horse, I want him to be familiar with cattle. There is no use denying the opportunities of acquiring the knowledge of cattle and the practice among swine is better acquired in the agricultural districts than in large cities, but when it comes to running horse practice, draft horse practice, opportunities in cities are better. Furthermore, city schools can be conducted at less expense than country schools. Comparative anatomy, physiology, pathology, practical botany—those things are, for example in the city of New York, largely taught by men who have made those subjects specialties, and who may attract students from many sections; for example, in New York schools students get their surgery from a medical college and a good deal of physiology from the medical school and from men who are thoroughly conversant with it and thoroughly well prepared to teach. I feel myself the present tendency to make the veterinary school the agricultural crutch is not the purpose for which we send our boys to school. We want our veterinarians to be more practical. Take the tendency to teach therapeutics—you cannot teach therapeutics that way—that is, as far as the boy gets and while I am very glad to go to him I would rather take the opinion on the question of therapeutics from a man like those who are practicing in a large city than I would from any pharmacologist who ever went down the pike.

I think it would be better for city and country to get together—let the city schools send the boys to the country for one year and the country boys be sent for one year to the city schools.

Dr. Williams: I was unfortunate in not reaching the room until near the close of Dr. Hoskins' address. I gathered from some of his last remarks that he believed there was greater loyalty in private than in state schools. I did not understand what kind of loyalty this was—loyalty to schools or to the profession. I do not think we should criticise anybody's loyalty without very good grounds. So far as I know, the men in the private schools have been loyal to their colleges. I have been a member of the faculty of a state college for twenty-two years. Every man who was on that faculty twenty-two years ago is a member of the faculty as it stands today. Every man is loyal to the school—they are just as loyal to the profession as any member of any faculty in any college. In Dr. Stange's remarks he stated we were changing very greatly the methods of scientific education. It is not our veterinary profession alone, but the change has overtaken all scientific education. When I graduated in 1879 veterinary education was given in the lecture room—that is out of date now. Any veterinary or medical school that attempts to teach any of these sciences, wholly or chiefly, in the school room is a dead institution. Today scientific education is conducted in the laboratory. That is the difference in veterinary education now and forty years ago.

Dr. Rogers has stated there are certain advantages in the city over the country. Granted. There are more cats in the city with intestinal difficulty on account of swallowing hair than there are sick cattle. We have a great many cats and dogs in our clinic and some of them come back very frequently. Some dogs as soon as they are liberated from the hospital go out and get into another fight and come back. As Dr. Stange says, the most pressing problems are among the meat and milk producing animals and the infectious diseases found among them. There can be no question about that. As a matter of fact, sixty per cent of the veterinary practice in the state of New York is with dairy cattle, and ninety per cent of the cattle practice is with the genital organs.

Dr. Rogers mentioned one very important truth, more important at one time than now, when he expressed the wish that students might pass part of their time in a city and part in a country college. In the college with which I am connected there

are thousands of dollars expended annually in order to give students actual clinical observation and experience. The only way to properly instruct students is to have adequate clinical instruction in connection with the college. It is an old idea, now done away with, that the college should give the didactic teaching and leave the practical teaching to a nondescript faculty which is not in control of the college. That is, the student during his vacation shall go out into the country and practice with a veterinarian and there get his clinical observation and teaching. I have seen some of that. I am not finding fault with the underlying principle. The point is this—whenever an institution sends students out to veterinary practitioners to get their clinical education they have no control over the character of the teaching by the practitioner, and the school is at the mercy of those practitioners. It seems to me it is the duty of the college to furnish that education to the student and not leave it to someone else.

Dr. Quitman: A few like Dr. Williams should realize a school in the country is a country school, but a school located in a city, whether state or private, is both a city and a country school. Dr. Williams has truly said that at least sixty per cent of the practice of today is dairy practice. Cattle raised entirely for meat production are taking the time and attention of the country veterinarian in many parts of this country where in our parts it is the dairy cattle that are given attention. I think it is a matter to be easily understood in making the statement that a city school has advantages of both city and country. You take any city like Philadelphia, New York, Detroit, Chicago, Milwaukee, Minneapolis, any of the cities of any size, and they are immediately surrounded by great dairy farms and in some cases have farms for raising meat-producing animals. I honestly believe that any school, whether it be Cornell or schools located in the cities of Philadelphia, Chicago or New York, within visiting distance, there will be as many head of cattle as there will be surrounding these schools located in the country, or, in other words, in a radius or zone of twenty-five miles surrounding a city school, there will be found as many head of cattle as will be in a zone of twenty-five miles surrounding the inland state school.

I believe Dr. Williams has underestimated the percentage. I would say in the country veterinary practice, seventy-five per cent is dairy practice. There are some locations where that will vary considerably. Take along those lines, twenty-five miles

right here in Philadelphia, there are as many head of cattle, and I know there are around Chicago, as around Cornell.

Dr. Williams: I was comparing only a few days ago the clinical report of two of our colleges, one in the country, the other in the city. Very few of our colleges issue reports regarding their clinical material. We have always issued reports regarding our clinical material because we believe that a clinical report better than anything else demonstrates the actual facilities for teaching. The other announcement which I examined was from one of our leading city veterinary colleges. The report shows that in the country school there was 100 times the amount of bovine clinical material as in the city school. I do not know of any city school which has shown by its published clinical report any great amount of clinical material among cattle, hogs, swine and in breeding animals.

Dr. R. C. Moore: I was wondering if there might not be a reason for the discrepancy in the great number of animals for clinics in city and country schools. I was told not long ago by a gentleman connected with country schools when they got short of clinic material they got pigs for castration—on that basis we would have a great number. I think in some of the city schools it is possible for a man to make $3.00 a day of the actual clinic material brought there for diagnosis, taking up three hours per day, sometimes our material will run to $6.00. I believe we have as much of a clinic as any veterinarians in the profession. Our lecture courses have diminished to a great extent. I do not believe they can be dispensed with, but they should be reënforced by the clinic, and by the autopsy, another important feature that is not receiving enough attention. Cases in the hospital should be watched carefully through their course or by students in a nearby stable or hospital, and brought right into the clinic to the college where the clinic is held, to be observed and a careful autopsy made, if death occurs, not only occasionally but time after time.

Dr. Geo. H. Miner: I understand the sum and substance of what we want to discuss is not the advantage of the state college or the city or country schools, one over the other, but what the trend of veterinary education is and to take up the consideration as to what subjects the present conditions have helped in one over the other. We want to discuss the question of sanitation and the problems that are arising recently in animal husbandry and animal production. I do not believe we are gaining anything

by this discussion pro and con in relation to city and state schools and I would suggest that we confine ourselves to problems that really interest us in developing veterinary education and making an animal turn out more valuable for future work.

Dr. Hoskins: I want to answer these discussions. I had in mind that the trend toward multiplication of weak state schools was not for the best. They can't get beyond a few years' instruction for we cannot get the states to pay for more than two or three instructors, and they are always in political jeopardy for their support from year to year under our political system. What we do not want is to lean towards the multiplication of these schools; they are in a very large number of instances attached to agricultural colleges that are seeking large sums every year for their own maintenance. In our efforts for higher education the last few years we have driven out of existence some of the better private schools. We had better turn our attention towards the larger support of them and encourage the enlargement of them for the advantages they offer in larger cities, for there is not a problem today in veterinary medicine that is not covered within a radius of twenty-five miles of New York city, with its great laboratories, its great clinical institutions—federal and municipal—with its transportation problems, not only with our own country but with the world; with the relation of animal diseases to man in a great metropolitan district. The horse shows, the dog shows, the poultry shows, even the feline shows, all come within the province of veterinary medicine. I am saying that the hope of veterinary education does not lie wholly in state schools, but with state schools liberally endowed, for medical education is expensive; it costs $2,000 to educate a medical student, for which they receive $1,000. Veterinary medicine for the future must not be in the line of multiplying weak state schools, but strong schools in the great metropolitan districts, and to look both for endowment and state support for the maintenance of these schools.

Dr. C. A. Cary: I want to say a word—let's get down to this thing. We are not going to settle the problem of education in five minutes and we are not going to change the facts. I have some idea of the conditions in New York and the South, and in Europe as well. I want to say that I have visited most of the prominent schools of this country and Europe and I have attended the clinics. I have never been in any one that has had all the things I thought it ought to have, or that they had a

corner on this whole thing, or, in other words, have written up a monograph. There are some things in the country we never have in the city, and vice versa, and, no matter how much they argue, it is a fact. We have a condition in the South which you have not much of in the North. They told me when I started in our small town of 2,000 inhabitants we would not have any students. I have had all the clinical work we could use, just as much variation as any schools I have seen with this exception—we do not have a great number of clinics. If I went to Dr. Hoskins, to New York, I would not see many things I see in my school. That is not a fault, not a fault of his school; it is a fact, nevertheless, and one we might get around—we find certain localities have their peculiarities in their surroundings and in their animal husbandry life. Just one thing I might mention. In Alabama, three years ago, there was not a carload of hogs shipped out. Last year in the peanut region we shipped 2,300 carloads, an increase in production last year of fifty per cent. These are facts from records made on these shipments. A good many of our men are doing more hog practice than anything else. Three years ago they could not have made a living in that neighborhood in that way. Yes, we want to get over this question and get together and do something and push things along. We are getting up into scientific areas, we want to get out and find these things, and so we are going to do something and not knock each other whether we have private schools or state schools. Some one says we are not getting what we ought to get. I believe you are getting all that is coming to you. Let us look the question square in the face and get to work.

FRATERNITY.*

J. W. Sallade, Auburn, Pa.

Anyone familiar with the history of this division of the A. V. M. A. realizes that the object for which it was formed has not yet been attained in full measure.

Annually good papers are presented and discussed. Subjects like "The Education of the Veterinarian," "Reciprocity and Equality in Veterinary Instruction," "The Curriculum and Veterinary Army Service" have been very ably discussed in papers by Drs. Bemis, Quitman and Turner, presented at the

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fifty-fourth annual meeting, and the discussion following reveals the fact that there is still a lack of coördination of the several bodies comprising this section and that we have not yet been able to find a concrete basis upon which to build a lasting co-operation.

It is generally known that many applicants for license are notoriously deficient and that it is claimed the same average conditions prevail among the graduates from all colleges (but not gracefully admitted). This leads us to believe that we can never have uniformity of product without uniformity in methods of teaching and that is the evident conclusion of men who have had experience in the examining room. Faculty members who have served on examining boards of the Veterinary Officers Reserve Corps, and have thus come in contact with graduates from all veterinary colleges bear testimony to the conditions found to exist by state board examiners.

Dr. Quitman in his analysis of the deficients gives the results as follows:

	Per Cent
Poor and improper teaching methods............	50
Deficient education of students..................	25
Deficient intellect (tho educated)...............	25

And this places the fault half with the colleges and half with the student body.

All members of the state boards are very naturally not infallible, some perhaps are incompetent, but the fact remains that they have to deal with the college product as it is supplied by the colleges.

If that be fifty per cent deficient the blame should not be placed on the board which rejects some applicants.

Being members of the same society demands that we should associate as brothers. Good fellowship always considers the other man's viewpoint and respects him as a fellow being and his opinion as sincere.

These are strenuous times and we are forced into service of whatever kind it is decided our station in life should fit us for. Age limit only determines the kind of service one must render.

Fraternity in its broad sense includes a common brotherhood of all mankind. God created man in His own image; His mission is to serve God and mankind and to love his brother as himself.

It should therefore be our aim to dwell together in peace.

The object of this section of the A. V. M. A. is hearty co-operation between the faculties of the veterinary colleges and

the examining boards, in an effort to discover the cause of deficient training and how to remedy it. Thus far it has apparently been the function of at least some of those connected with the faculties to charge incompetency, irregularities, etc., to the boards and thus hope to escape responsibility. They argue that the questions used by the board should be submitted to them, not for criticism, but as a guide to enable them to prepare students to meet the requirements of the boards.

To my mind there must have been something the matter with the teaching or the manner of issuing diplomas to students, which impelled the enactment of laws creating state veterinary medical examining boards whose function it is to safeguard mankind and brute creation against charlatans and impostors, some of whom might have escaped from a recognized veterinary college.

In contention of that view it might be justly said boards do not fix the curriculum; they have no voice in selecting the teachers or in shaping the material from which colleges attempt to create their product, but are public functionaries whose duty it is to place the seal of approval on college work. Therefore, all veterinary colleges should teach the same subjects, have a uniform program, proper equipment and the best teachers available, to thoroughly teach every branch and instill the student mind with its beauties and its application.

Much care should be exercised in matriculating students. Preliminary education is a necessary qualification, but not the only one, and perhaps not the most vital one. Application and adaptability are important factors and a period of probationary service would probably develop those qualities.

Fee collecting with some colleges is the principal if not the only source of revenue and that may account for the insufficiencies complained about.

Good fellowship and moral courage will aid us in recognizing and applying the remedy. There can no longer be any question about the lack of knowledge many students possess after finishing a prescribed course in some veterinary college. That fact is too patent for contradiction. They should never have been allowed to continue to the end. Their money, time and energy applied in some other vocation to which they were fitted by nature would thus have been a real benefit and the examining boards which had to deal with them could have been saved many labored expressions by the faculty that must have and should have recognized his intellectual deficit.

The examining boards should be composed of men of mature judgment, experience and moral responsibility, whose aim and purpose it should be to honestly and impartially develop the product of the college. Their certificates must represent quality, their examination should be fair and practical and honestly cover the field of instruction. No good can result from asking catch questions. The element of fair play must not be lost sight of—justice to all, the guiding star.

While the faculties have a responsible duty to perform and are performing it conscientiously, the examining boards are equally charged with responsibility—that of safeguarding the general public against imposition from spurious pretenders.

Under their signature they guarantee the diploma, conferring privilege, honor and authority. Such being the high purpose of these several corelated bodies, it is self-evident that the same motive of action is dependent upon either and that our relations ought to be of the most friendly character.

In like manner we are responsible for the personnel of the veterinary profession and its power as a factor in the community.

If the spirit of coöperation and fraternal feeling is in us, deceit and duplicity may not enter into our relations. Faculties will welcome constructive criticism and weak points which may exist in the teaching of any subject receive correction.

If, on the other hand, examining boards become obsessed with the idea that it is their function to puzzle applicants for license with catch questions and thus not only discommode and as a result reject them, but also cast reflections on the college, they practice unfair tactics and perpetrate a wicked injustice on both.

Unfortunately, there does not appear to be any remedy for unequal standards of examining boards under state regulation, since the state acts under which we operate are so vitally divergent that common ground for reciprocity is not available. That, however, does not prevent us from adhering to a moral code, and if colleges were standardized and the curriculum uniform, students from any one of them should be able to acquit themselves satisfactorily before any board, provided such board is imbued with the power of the golden rule.

Our relations of faculty and faculty, of faculty and board and one board with another should at all times be amiable. Nothing that I can think of is more detestable than an endeavor to take undue advantage of another; by doing so is not only disreputable but brands you as an undesirable associate.

If this humble effort will stimulate some discussion along these lines I shall have reached my objective.

I can see the beauties of the subject but am incapable of exhausting its possibilities.

In the discharge of our several duties, the same ideals and motives must prevail. The primary condition of successful cooperation must be a fraternal feeling, a certain degree of mutual confidence.

The advancement of the veterinary profession and the preservation of its reputation are largely dependent upon our corelated functions.

DISCUSSION.

DR. F. C. WAITE: May I have the privilege, not as a military man but as Dr. Waite? I have been in professional work twenty-five years, devoting all my time to it, investigating medical schools of this country, and the navy schools of this country, and am very glad of an opportunity to give my opinion as to what is the matter with things brought out in this paper. I have had in my official work reports come to me from medical, dental and veterinary schools—I may say the proportion of students in veterinary schools is much greater than in medical or dental ones.

The veterinary students must be of more superior intellectual ability than those among the dental or medical men, or the teaching must be far superior, or the subject must be extremely easy, or what I believe is the real thing, that the pedagogics of teaching are not appreciated. I find several of the veterinary schools reported that all their students this year passed every course without a condition. Those who taught know that is not the case; in education the rate (total men who are conditioned and fail, according to reports) is from ten to eighteen per cent. We know dental education is not up to medical education, which is twelve per cent; total in veterinary schools is two per cent. The reports of veterinary schools for this year is less than two per cent of conditioned students; about eighty-five per cent of all men failed in not a single subject. These are facts and startling facts to me. Another thing I have learned which is startling to me as an educator is that the veterinary course in some of the schools of this country is not graded. I learn it is possible for a man to flunk freshman subjects, go along four years with those conditions hanging over him and then, at the end of four years, be denied

his diploma. Why? Because he had not passed the subjects three years ago, a subject or subjects which if it is a graded course is necessarily prerequisite to the courses above and instructors in reputable veterinary schools in this country are permitting men who have shown they have not the knowledge on fundamental subjects to go ahead and take subjects based on those and go on and on, and not dismiss them until the entire course has been complete and the inference is, not dismissed until they have paid their entire three or four years' tuition.

We might as well face these things. That is the thing medical schools did twenty-five or thirty years ago, things they got out of twenty years ago. They recognize the course must be graded, one subject is preliminary and requisite to another and a man should not be permitted to go on. I found a report from one school in which a man had flunked seven freshman subjects and the dean said he thought he could make them all up on opening of next term. These are some of the startling things in comparison with what is being done in medical and dental schools and I get to my feet, not as an officer, but as a teacher, to call your attention to these facts, that there should be something done in the question of regulation. We as teachers know we get in every class men who are totally incapable; in all of the veterinary schools of this country, this year, there has been only one man barred for poor scholarship, according to the reports I have received. Just one man!

In one dental school there were sixty-five men barred for poor scholarship and were told they could not return. A man who is a poor student and is allowed to go on certainly depreciates all the work of his college. I hope the stenographer will put my name down as Doctor Waite, not as Captain Waite. I am saying these things, I hope, to help you.

Dr. N. S. Mayo: I wish to corroborate what Dr. Waite has just said. It has been sometimes pleasant but sometimes unpleasant to visit the veterinary schools of this country and inspect them for this association, finding the condition, from a teaching point of view, from an educational point of view, at a number of veterinary schools has been terrible. This hardly describes their condition. Not long ago a graduate of this last spring, a young man with a good preliminary training, a high school graduate, said: "I have graduated; now I want to go to a real veterinary school. Where shall I go?" I discussed a number of schools that were real schools. Another student said to me,

"So many failed in the class since I have joined it, and they were pretty sore about it." He said, "We are not kicking because they failed; we are complaining because they ever let them start, because every student who knew anything, knew from the beginning if they were not getting fair marks they could never get along." Where a student realizes that condition there is something wrong with that school. Another thing the writer of the paper touched upon is one I have thought of many times—and that is the question of eliminating from the schools students of veterinary medicine, those who never will be successful. So far as I know, this is not done in veterinary schools. Those of you who have taught know that after a year or a little more you can pick out some men that you are convinced that if they went to a veterinary school for ten years would never be successful in that profession. In some of the better medical schools—I do not know that they do it in all of them—they take those students and say, "You are not adapted to medicine; you had better quit; go somewhere else and find another sphere of usefulness." I know a young fellow who went in for aviation, aeronautics, a splendid student. They had him there a month or two, then said, "You are not adapted to aviation," but it was a kindness to that fellow to do that, and I believe the veterinary schools which have the real training of successful, leading veterinarians—a credit to their profession—at heart, should take up this question and help these young fellows that have started on the wrong track to get them in some other line of usefulness and success.

REQUIREMENTS FOR ENLISTMENTS FOR VETERINARY STUDENTS IN THE ENLISTED MEDICAL RESERVE CORPS.*

Captain F. C. WAITE, Washington, D. C.

Instead of having the above title, it should be "Love's Labor Lost." In June I was asked to come here and read a paper on this subject. They gave me two months to prepare it and I carefully organized things, and was all ready to give you the result of my efforts when I received orders that there was nothing to tell at the present time.

There was never any enlistment in the Medical Reserve Corps, nor in the navy nor in the Marines, and it is not possible for a

*Presented at Section of Veterinary Faculties and Examining Boards, 55th Annual Meeting, A. V. M. A., Philadelphia, 1918.

man to get a commission now between eighteen and forty-five, as the door has been shut tight on all civilians. How long that is going to continue no one can predict and not knowing what is going to happen, no one can predict what the conditions of the future will be. I tried on Saturday to find what the situation was so that I could tell you. I went to the chairman of instruction on special training of the general staff, and that committee has charge now of all education and training in relation to the army, civilian instruction and training, and asked him what I could tell this body as to the present status and he held up his fingers and said so much—nothing. Nothing told at the present time. We hope something may be said in a very short time, but until definite orders come through nothing can be said as to what is going to be done with prospective or present students. I regret very much to have to be so unsatisfactory, but it is the best I can do.

THE EXTENSION VETERINARIAN.*

GEO. M. POTTER, Manhattan, Kansas.

It would be interesting to trace the growth of the medical profession, and the concurrent development of the veterinary profession, step by step, from the superstition and quackery of the dark ages to the triumphs of modern surgery and preventive medicine, but that is a part of the history of our profession with which this audience is entirely familiar, so I will pass directly to the consideration of my subject. The latest development along medical lines consists in the education of the public. No longer does the art of healing depend upon mysterious secrets to be jealously guarded by the physician, for the practice of medicine is a science dependent upon certain principles, which the people at large may understand to a degree. Preventive medicine has assumed great importance in the control of contagious diseases. The great plagues of the past can now be controlled by quarantine, preventive vaccination and the establishment of proper sanitary surroundings. Our success in controlling tuberculosis, typhoid fever and smallpox is directly proportionate, however, to the knowledge which the people have concerning these principles and the extent to which they make their habits of living conform to them. Education, therefore, becomes an important

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element in combating disease. The same principles apply in animal diseases, and tuberculosis, abortion disease, blackleg and hog cholera can be controlled by essentially the same methods. The same need of education is seen here, and in response to that need there comes forward the extension veterinarian.

Let us go into detail concerning the necessity of educating the owners of domestic animals. Our present methods of controlling disease, effective as they are, and yet so imperfect, are of very recent origin, and there has not been time for them to be generally understood and adopted. The revelations of bacteriology are so recent, so astounding to the lay mind, and have so changed our conception of disease that we should little wonder at the slowness of the public in accepting them. It was but yesterday that our animals ran at large upon the public range, and the older generation cannot forget the practices of former days. They have not changed their methods to conform to the changed conditions. Animal values have been so low that stock was often permitted to die rather than incur the expense and trouble of treatment. Competent and adequate veterinary service has not been present except in a few favored sections. The purebred industry and improved transportation facilities have disseminated disease far and wide. Ignorance and superstition still prevail to a large extent. These facts not only indicate the need for educational work but illustrate the difficulties. There are other difficulties. The inertia and indifference of the great mass of live stock owners impede progress; political interference hampers efforts for disease control, and dishonest selling of diseased animals is continually spreading infection.

But great as are the difficulties, the possibilities are even greater. Everywhere men are demanding better stock, and the more valuable animals require and receive better care. Every man who raises purebreds may be made a missionary for better sanitary conditions and better methods, if properly approached. Our agricultural colleges are ever striving to improve conditions, and our veterinary colleges are turning out men better qualified than ever before to handle these problems in an intelligent and scientific manner. There are now many organizations and whereever we find a breed association, a cow-testing association or a boys' and girls' club there we have a valuable agency for disseminating information. The work being done by our Federal Meat Inspection Service offers great educational possibilities which are being used to a limited extent.

The public is awakening to the dangers of human and animal diseases and their desire for wholesome meats and pure milk can be taken advantage of in any educational campaign.

THE WORK OF THE EXTENSION VETERINARIAN.

What shall we teach? Not surgery, not materia medica; these belong to the veterinarian and there is no necessity for trespassing upon his field. But there is need for teaching the fundamental principles of preventive medicine and sanitation. We must teach the stockman that disease is not a visitation of Providence over which he has no control, but that it is due largely to the conditions which he himself imposes upon his animals, and he can, by taking thought and employing correct methods, maintain his herds in health.

The stockman needs to understand the specific nature of disease, that blackleg, hog cholera, tuberculosis, etc., are each due to a definite organism and there are methods adapted to each which he may employ in combating them. He should learn that many of the infectious diseases, for which we have as yet no cure, can be prevented by proper methods of herd practice, and by vaccination. We should strive to give him correct information concerning biologic preparations, citing their limitations as well as their virtues, lest he, through disappointment at occasional failures, become skeptical of their value.

We must demonstrate the necessity of sanitation, pointing out the fact that dark, damp, filthy quarters harbor disease and lower the resistance of animals, while the opposite conditions promote health and vigor. The layman must be taught that pathogenic organisms cannot withstand the direct rays of the sun and he can best combat disease by flooding his stables with sunlight, by the use of disinfectants and by the liberal use of whitewash.

Finally, we must impress upon our stockman the importance of proper herd management. He must be constantly on the alert to protect his herds against the introduction of disease. There is ever-present danger in our traffic in animals, not only in the purchase of diseased animals, but because of the frequency with which disease is contracted from infected yards and cars. The quarantine of all newcomers until health is assured, therefore, becomes an important precaution. We must teach the necessity of isolating affected animals and the prompt employment of competent veterinary service where, in spite of precaution, dis-

ease breaks out. The rotation of pastures plays an important part in controlling both infection and parasites. Likewise the management of the breeding herd is of utmost importance in controlling certain diseases. In short, we should urge the adoption of a definite system of herd improvement as the most effective weapon in controlling disease.

THE MAN.

What qualifications must the extension veterinarian possess? First and most important is personality; those qualities which enable him to meet all classes of men and discuss their problems with them intelligently, sympathetically and yet with dignity; in other words, a "mixer." Second, experience is essential in order that he may convey the impression of one speaking with authority. If you will pardon the personal reference, the writer has found a varied experience, including postmortem work in meat inspection, field work, laboratory and investigational work and teaching, of the greatest value. Experience gives the breadth of view which is essential in educational work. Third, the ability to translate technical terms into the everyday language of the stockman. His audience must not go away bewildered by a lot of terms which they are incapable of understanding. The questions which the intelligent presentation of a subject is sure to call forth aid greatly in clarifying it. Here is tested one's ability to think on his feet, and here, if he rises to the situation, he can often do his most effective work. Here also a humor without sting, a repartee that does not cut, and a few well-chosen illustrations help to enliven the discussion and the audience departs in happy frame of mind. Other qualifications might be mentioned but these are fundamental.

RELATIONSHIPS.

What relations should exist between this new phase of veterinary activity and the established branches, such, for instance, as the regulatory work of state and nation, the college, and the practitioner. Regulatory work, if it is to be effective, must from its very nature become educational. Whoever has undertaken to control animal diseases has soon discovered the importance of public appreciation of the underlying principles of disease control. We have numerous examples; for instance, cattle and sheep scabies, foot and mouth disease and Texas fever. In regard to the last, we have, after twelve years of effort, accompanied by much friction and strife, gotten the work well organized and

progess in the future should be more rapid. Results have come more through education than compulsion. Who can say how much more rapid our progress might have been had there been a well-organized extension force to prepare the way? At the present time educational methods are being employed to very great advantage in controlling hog cholera, and the demand for information concerning other diseases is insistent and widespread. It is not too much to say that every effort at regulation should be accompanied by and even preceded by an educational campaign. Therefore, the relation of education to regulation should be intimate.

There must exist the same intimate relations between extension service and college and laboratory. Unfortunately, there has been somewhat of a tendency in official quarters to regard these as entirely separate and distinct branches, each to be confined to its own field without reference to the others. The extension worker must not concern himself with regulatory matters and all investigational work must be left to college and laboratory. But that is wrong. These various lines of activity are so interrelated and so dovetailed together that one cannot be altogether separated without doing violence to the whole. The extension veterinarian will naturally teach the ideas which he received in college, amplified by his own experience and the researches of the investigator. What he teaches will differ only in detail and manner of presentation; the principles will be the same. We must, therefore, keep in close touch with these other branches in order to be abreast of the times. On the other hand, he can himself contribute much. He meets many more stockmen than they, visits them on their farms and discusses their problems with them; consequently, his knowledge of conditions is much more intimate than that possessed by the college professor or the laboratory man. In his extensive travels he is in a position to gather valuable data, and as he gathers and interprets facts to his audiences he thereupon becomes an investigator of the first importance. It would be most unfortunate were we to permit our so-called division of labor to deny us the benefits of his observations in the field of investigation. The activities of the extension veterinarian must be closely linked with those of the college and laboratory.

The relations that should exist between extension veterinarian and practioner are not so easily defined. They are more personal and must vary according to conditions. This question of veter-

inary extension was raised by the writer last year at a meeting of this body. At that time the fear was expressed that this new form of activity might encroach upon the field which the practitioner regards as peculiarly his own. A venerable member of many years' experience as educator and practitioner gave as his testimony that he had no fear of this movement to educate the public. In his experience the enlightened client had always proved the most satisfactory one with which to deal.

There has also been a tendency among veterinarians to confuse the extension veterinarian with the county agent. The two are not identical, although the former must work much with the latter. The activities of the county agent along veterinary lines have engendered considerable heat among veterinarians, and indignation meetings have been held and resolutions passed. The veterinarian cannot justly be blamed for his resentment. He believes that a profession that is worth working for is worth fighting for. He has had to spend three or four years and much money to acquire it and pass a rigid examination before he can practice. His profession is at once his life work and his means of obtaining a livelihood. He sees what he considers an irresponsible person who knows comparatively little of the requirements of the practice of medicine come in, in violation of those laws which he himself must observe, and with semiofficial sanction begin to tear down his (the veterinarian's) work and deprive him of his living. It would be a poor and unworthy "stick" indeed who would not resent such treatment. But I would have the veterinarian pause and consider the facts. The county agent movement, too, has sprung up in response to a need. We needed a more systematic, a more purposeful agriculture and that could be brought about only through competent leadership, hence the county agent. The agent is usually a young man of college training, chosen for his fitness as a leader. It is his province to study the needs of his county and initiate movements to meet them. In case of outbreaks of animal disease he may appropriately take the initiative in a campaign for their control. But sometimes in his enthusiasm and desire to serve he oversteps the bounds. His partial knowledge does not permit him to realize his limitations and he makes mistakes, with the result that sooner or later "his chickens come home to roost." I had the experience of detecting such a mistake shortly after it had been made and demonstrated it to the agent in a manner that did not cause resentment. That same agent was a valuable man to his community, in spite of mis-

takes, because he was the only man to take the initiative in emergencies. He also turned much work to the local practitioners which they might not otherwise have received. Those in authority are beginning to realize the danger of permitting the agents to perform veterinary service, and this abuse may be expected shortly to correct itself.

In this same connection I cannot hold the veterinarian entirely blameless. He has not always filled the need of his community. He has not often enough regarded himself as a public servant but barters his services for so much money. Not frequently does he educate his clients in the principles of sanitation and disease control. Not often does he assume the initiative, in a spirit of leadership, for the control of outbreaks. Too frequently does he forget the duty he owes his profession, and is guilty of carelessness in diagnosis or treatment, failing to act the part of a professional man. Too often have I had the reply, when recommending to a farmer that he employ veterinary assistance, "Why, I can vaccinate my hogs myself and do a better, cleaner job than will Dr. Blank." What then can I say? Does not that reflect upon the profession as a whole? Does it not make ridiculous the complaint of the veterinarian, and strengthen the case of the county agent who will do a fairly satisfactory job without charge? These deficiencies we may refer to the failure of our colleges to inculcate in their students the idea of the responsibilities devolving upon the professional man. We as educators and leaders must strive to overcome these faults. We may have tried in a perfunctory sort of way, but there must be a conscious and concerted effort to make each and every student and every practitioner realize his responsibilities toward the public and toward his profession.

There is yet another angle from which to view this question. There has never been adequate veterinary service in the more sparsely settled sections of the country and war has accentuated this deficiency, as a large number of the most capable veterinarians have entered military service. A large part of our meat-producing animals come from those very areas. The diseases continue to operate, however, and there are few trained men to direct their control. In this our great national crisis we cannot permit these animals, so necessary for the food supply of the country, to die, so in the emergency we must call upon the most readily accessible help, which in this case can be rendered by the county agent. He is already rendering valuable service in the

campaign against hog cholera, in vaccinating against blackleg, and in many other ways. Until we can supply competent and adequate veterinary service we cannot well deprive the stockman of the only relief available to him, consequently the ideal must give place to the requirements of our present necessities.

The county agent movement represents progress. We know the fate awaiting him who attempts to impede progress; therefore, let the veterinarian beware how he opposes the county agent. The two can work together to mutual advantage and each should be willing to go half-way to meet the other.

Finally, I would have this body, this Section of Veterinary Faculties and Examining Boards, consider this whole question of veterinary extension. It is a new departure in veterinary education. Shall it be left to develop haphazard, or shall it be intelligently directed to meet the needs of the times?

Again, in regard to the county agent, the veterinarian feels that he has a grievance. Let us, the friends of education, take up this matter in a dignified and friendly manner with the proper officials, try to discover the causes responsible for any unsatisfactory conditions, eliminate them, and then join with these other representatives of progress for a better and more productive animal husbandry.

DISCUSSION.

Dr. Beacham: I am sure we have all had thoughts on this subject. The question, as it appears to me, is, is it a menace? I believe it is worth while to give it the consideration that Dr. Potter has given it, with free and open minds, either for or against the subject. Just what do we mean by the term "extension"? We are all more or less familiar with the agricultural experiments of the last forty years, we are also well acquainted with the rapid growth of our agricultural colleges during the last two decades. We recognize the fact that some great achievements have been rendered during this time, but there was no way by which the information obtained by the experiment station could be extended to those most interested, as a very small percentage of even the boys on the farm were able to attend the agricultural college. The great mass of the farmers have neither attended college nor the experiment station; some means had to be provided for extending this information to the farmers; they must learn the sanitary principles underlying our successful activity. The extension service was established to render this

service; it was established by both veterinary and state legislation; it employs instructors and specialists; it has correspondence schools for students who otherwise could not obtain this education. The specialists cover nearly all the subjects connected with agriculture, forage crops, animal husbandry and live stock sanitation and the prevention of animal diseases.

We know there are experiment stations employed for a certain amount of research, our agricultural colleges have taken in medicine as a part of their curriculum, the experiment station is employed for precisely the same purpose. The extension service serves as a sort of package delivery between agricultural colleges. Another part of the extension service that Dr. Potter referred to is the county agent. In too many instances the county agent has overstepped the bounds of propriety and engaged in activities otherwise not intended for him or for which he had no particular training, but we must remember that the county agent is a man of no special training along veterinary lines; he has not had the benefit of any rules or regulations particularly defining the lines of his activities. He had to depend wholly on his own conception of the position. The farmer is anxious to learn, ignorant or rather unconcerned regarding the fine points of ethics, referred to the county agent for advice. Sometimes it was not easy for him to refuse. In too many instances he was too eager and jumped at the opportunity. Recently county agents are being more restricted in their activities; they are being controlled; rules are being perpared to govern their actions. It seems to me it would be much better for us to get in and help on these rules to safeguard his interests. Another service that we can render is to get the county agent and farmer to work together with the veterinary surgeon. I could cite county after county in which county agents have been located for two months to one and a half years where you have never met better coöperation in any county. By the exercise of a little tact and common sense on the part of the veterinary surgeon the two parties were brought together; since then they are working with absolute harmony, to the benefit of every one. Are we going to array ourselves against it and gain the ill will back of this movement and force the treatment of preventive medicine in the hands of those not prepared for it, or are we going to support it and try again to retain the interest of the live stock industry, without which the veterinarian cannot exist, and afford ourselves the

opportunity of confining the teaching of veterinary medicine or prevention of veterinary medicine to veterinarians?

Dr. Williams: Dr. Potter in his interesting paper alluded to one special type of the extension veterinarian. Veterinary science has had a sort of dual or triple origin. The older veterinary schools in continental Europe were brought into existence for the purposes of the armies of Europe to teach regarding the diseases of horses, as an essential part of the military service. In this country, when agricultural colleges were founded, there was a widespread interest in the teaching of veterinary science as a part of agricultural education for the benefit of agriculture. Later we have come to the point where we regard veterinary education as meeting and coalescing with medicine. My work upon the diseases of genital organs of cattle relates to animal husbandry, to the production of human food, both in quantity and quality, and has a relation which has not yet been carefully studied regarding human health and life. When we reach the point of the influence of diseases of the genital organs of cattle upon human health the boundary line between human and veterinary medicine disappears. When agricultural colleges were first founded they nearly all included veterinary science in their curricula, not to make veterinarians, but to better fit men for agriculture. I started in that way, in an agricultural college, with a view to learning a little veterinary science to make me a better live stock husbandman. It was a tremendous fizzle, because I have never had anything to do with animal husbandry, but went into pure veterinary science instead. For five years I was paid a salary for teaching veterinary science to agricultural students; whether I taught veterinary science I will not say. So far as I know, I did no good. I did not know how to present the subject and I have felt that my work as a teacher of veterinary science in agricultural schools was largely without profit. We still have veterinary education in agricultural schools as a part of the regular curriculum. After my experience of five years I retired from the field for twenty years. I am now back again trying to teach agricultural students something along the lines which Dr. Potter has mentioned. I find there is a constant tendency on the part of agricultural students to ask for more and more regarding the treatment of disease and less and less regarding the knowledge I think I should give them. There is a constant conflict which I have not as yet been able to overcome. Students come to me from the agricultural college and ask whether they

may take the regular course in veterinary obstetrics. I tell them no, because they have not yet had subjects which are considered by me essentially preparatory subjects. Still, I think by being very cautious and limiting ourselves to the nature of disease and doing a very little work with reference to first aid with animals, a great deal of advising them what to let alone, I think we are making some progress. Extension work is old, as old as our agricultural colleges; they were founded about 1868.

We have another type of extension veterinary teaching to farmers, that of the lectures by veterinarians in farmers' institutes and farmers' meetings. We have the two plans in operation at present in the State of New York, the farmers' institute conducted by one set of authorities and certain other farmers' meetings by other authorities. The farmers' institute authorities employ veterinarians to attend these institutes and to lecture upon veterinary subjects. Being a great dairy state, one of the subjects talked about is that relative to abortion in dairy cattle. The men who are employed by the institute authorities to lecture upon the subjects are always in conflict in their teachings with my teachings in the state. I go very largely to the farmers' meetings and to the meetings of dairymen and dairy cattle breeders and say one thing and these farmers' institute workers tell another thing, and so the conflict goes on. In some states free veterinary extension work is carried on by correspondence. There is a force of veterinarians selected by the state, or the state university. The veterinarian does not see the animals at all. There has been a considerable resentment aroused. This is inevitable because the veterinarian sitting in his office and perhaps without practical experience cannot be expected to make the same diagnosis as the veterinarian who examines the animal, so there arises conflict and a certain degree of ill feeling.

I have been advised since I came to the meeting regarding an occurrence pretty close to Dr. Potter, in an adjoining state. I was watched by a man while I did a little instrumental work upon the genital organs of cattle. He had never done any of the work himself and started out at once teaching others how to do it. If he had entitled his work, "Teaching others how not to do it," he would have gotten along much better, because he gave to the live stock owner the idea that he knew just what to do. I think it is about as proper for a veterinarian, be he in extension work or other capacity, and I belive Dr. Potter will agree, as for a human surgeon to go out among people and teach the heads of

families to perform the appendicitis operation as to go out and instruct the owner of valuable cattle how to meddle with live stock. I do not care what branch of this extension service one takes up, no difference whether he teaches agricultural students in college, by correspondence, or as a traveling extension veterinarian like Dr. Potter, he should be very, very careful what he does and not try to teach things to men who are not teachable under the circumstances. There has always been danger and always will be of a teacher overstepping his office. We must leave diagnosis, surgery and therapeutics with veterinarians, and the greatest value we can give to popular teaching is to indicate where the boundary line lies between those matters which only the trained veterinarian is in position to comprehend and those which may be successfully taught to the layman.

There is one other plan for extending knowledge to veterinarians and that is by publications in the form of bulletins, circulars, etc. Personally, I favor these very strongly because the teacher can then place in writing over his signature what he wishes to say, and it stands there as what he has said. It is difficult to speak to people and not leave a wrong impression. For example, in a recent publication of my own, with regard to abortion of cattle, I stated that some of the things recommended could be done by the animal husbandman, some by an ordinary veterinarian, some by specially trained veterinarians. I got a letter of inquiry a few days ago asking how do I go at it to douche the uterus of a cow which is sterile? I said, send for the veterinarian who knows how. That is all the answer I had for that man and I can not and will not attempt to give any other. What impresses me in all this work is that every part of it should be carried out with the very greatest care that less harm should be done than good.

Professor Robert Graham has been discharged from the army and has returned to his work as professor of animal pathology at the University of Illinois, Urbana, Illinois.

A bill to establish a veterinary school in connection with the University of Illinois has been introduced in the Legislature. This bill has the support of the Illinois Veterinary Medical Association, the Live Stock Association and the university authorities. The prospects for its passage are good.

ANIMAL HUSBANDRY AND ITS IMPORTANCE IN A MODERN VETERINARY COURSE.*

H. H. Havner, Pennsylvania State College.

A statement with reference to the world's live stock situation will serve to establish more clearly the relationship and importance of animal husbandry in a modern veterinary course. From figures submitted by the Food Administration, the European live stock losses resultant by the war are: for our European allies, 47,000,000 head of stock; for Germany, 18,000,000 head; for Austria, Russia and Turkey, 35,000,000 head. The total European loss in livestock resultant of the war has been 100,000,000 head, or over half of the total amount of live stock in the United States. Upon the United States will rest the main burden of replenishing the breeding herds of Europe. Recently agricultural commissions representing in an official capacity their respective countries abroad have visited the United States and have inspected several breeding herds in this country, with a view of making purchases after the war. This is significant since it shows that European countries will likely turn to the United States for the foundation of breeding herds.

Pure-bred live stock breeders in the United States are very optimistic as to the future of the live stock industry in this country. During the next few years marked progress can be expected in all live stock breeding operations in this nation.

FEED QUESTION AN IMPORTANT ISSUE.

Aside from the importance of the live stock industry, the question of feed cost and food conservation should be briefly discussed. Because of the necessity for grain conservation, the Food Administration has urged a maximum use of non-edible human foods to a point as far as is practicable in the making of beef and pork. A campaign with this in view has been launched through the various agencies which by reason of their organization are in direct touch with the farmer or producer. The States Relations Service, through the extension service of the several agricultural colleges, has been the chief agency through which this campaign has been carried out.

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POINTS EMPHASIZED IN THE MEAT PRODUCTION DRIVE.

The points emphasized in the meat production drive which was launched in this country some time ago are:

(1) The use of a larger amount of roughage with a wisely balanced grain combination in order that the annual meat production of the United States can be increased without cutting any serious inroad into the grain supply that can be used for feeding our own population, as well as the population of our European allies.

(2) The keeping of more live stock—a policy much needed for the period of the war and also for the reconstruction period of the world's agriculture after hostilities have ceased.

(3) A well-outlined system of management for herds and flocks so that a maximum efficiency in production may be realized.

These fundamental considerations have been included in the live stock development program of a majority of our states where live stock constitutes the basis of successful agricultural development. For the most successful results in such a live stock program it is necessary that such a movement have the most active support of the producer, the consumer, all agricultural organizations, and, lastly, the most hearty support of all associations, which, by reason of the profession of the members, are closely allied with any general live stock policy.

Live stock constitutes the long-range gun of agriculture; the making of beef and pork by the use of non-edible human foods guards against a grain famine; efficient management of herds and flocks insures a maximum profit to the farmer; these are the underlying reasons for teaching animal husbandry in a modern veterinary course.

What animal husbandry subjects are most needed for the student of veterinary medicine? It is quite a common conclusion by a majority of all veterinary colleges that animal husbandry in a modern veterinary course should comprise such essential subjects as, "Types and Breeds of Farm Animals," "Animal Breeding," Live Stock Judging" (which includes both market and breeding animals), "Feeds and Feeding" and a "Live Stock Management" course, which should include subject material and practicums dealing with the fitting of animals for show, the harnessing, driving and improved methods of breaking horses to work, and lecture material, and, if possible, actual practicum work which deals with all phases of live stock management.

A majority of veterinary colleges could not be criticised for not offering these animal husbandry subjects. A lack of animal husbandry knowledge has been due in a large measure to the fact that the average veterinary student has not appreciated the importance of these subjects, and consequently has taken only enough interest to get a passing mark without making the best use of the material presented with a view of using it in the future.

The reason for this apparently half-hearted interest in animal husbandry by the average veterinary student while in college and for a time after graduation seems to be due to the student viewpoint that agricultural subjects, of which animal husbandry is a part, bears very little importance to the practice of veterinary medicine. It is found, however, that this viewpoint changes when the veterinarian has been out of college some five or ten years. The veterinarian is bound to discover sooner or later that his profession is in reality a part of the agricultural development of our nation. For the best success of the veterinarian and the live stock breeder one of the fundamental problems seems to be to get the student to appreciate the importance of the animal husbandry subject matter which is given as a part of the veterinary course. We will appreciate, I believe, the fact that the student's viewpoint of a given course and the interest he takes in the subject matter presented will depend to quite a large extent upon the ability of the instructor to present the material. The subject matter ought to be presented so that it will be fully understood and also should be given a practical application to the student's future work. One of our leading veterinary educators believes that the animal husbandry subjects should be taught by a man who has a degree in veterinary medicine, as well as a degree in animal husbandry. It is the idea of this educator that a man so trained will be in a position to present the important phases of the animal husbandry subject matter as it relates to veterinary medicine. One of the ways where improvement can be made in assuring a more thorough knowledge of live stock for the veterinarian is to take steps which will overcome the tendency of students to minimize the importance of animal husbandry in a veterinary course. In some instances this lack of sympathy for live stock subjects may be due to the way the subject matter is presented; in other cases it may be due to a lack of harmony and coöperation between the members of the faculty of the school of agriculture and the school of veterinary medicine, and, lastly, the scheduling of too many subjects

for one semester or year's work. The latter is bound to cause a neglect of the animal husbandry work offered. To insure a more hasty progress of the veterinarian in his work this matter is certainly worthy of thoughtful consideration for it must truthfully be admitted that if the veterinary student does not get hold of the fundamental animal husbandry subjects while he is in college it will retard his progress and the progress of agricultural development until he has learned these things.

There has been a tendency toward a spirit of fraternization of veterinarians and live stock breeders the past few years. This is shown by the holding of live stock breeders' meetings and veterinary associations' meetings on the same date and at the same place. While it has been advisable to hold separate sessions for each organization, the fact that the meetings were held at the same time has made it possible for joint meetings to be scheduled. At these joint meetings opportunity has been given for both veterinarians and live stock breeders to take part in the discussion. Many points have been cleared up by this open and above-board discussion, and it has been possible to proceed much faster with regulatory sanitary laws for the control of disease because of a common viewpoint. In many instances both a clear and a common understanding has been made possible because of a frank discussion of certain fundamental principles of live stock disease control. Both the veterinarian and the live stock breeder can be expected to share the responsibility that belongs to each of them providing a common understanding and a practical and workable plan of live stock disease control is mapped out.

For the success of our nation's live stock breeding enterprises it might be a very timely suggestion for all veterinarians and particularly the members of this association to give this subject of the relationship of the veterinarian and the live stock breeder some thoughtful consideration. If this relationship is established in a proper manner in the classroom in our colleges an important step will have been taken to insure closer coöperation and, therefore, more rapid progress in all matters pertaining to the interests of the live stock breeder and the veterinarian.

DISCUSSION.

Dr. Connolly: I think the time will come when we will put a veterinary education on the same basis as we have medical education. I think this association in the past has been working along wrong lines in this sense, that we have increased the pro-

fessional version of it at the expense of the preliminary requirements. I think an ideal veterinarian is one who has graduated at a veterinarian college and has done these things because he needs them as a farmer, and as a man who will give some help to develop the live stock interest. Then, too, on top of his agricultural education, as some of the members of this association have done, and they make splendid men. Some are splendid practitioners. As it is, I believe the time will come when we will regard some of the things mentioned as prerequisites. In our medical schools we regard a high school education necessary; in some schools, like Johns Hopkins, they require a collegiate education; in some others, they require two years' college work. I think it is not too much to require now, instead of two years of high school work, four years. I believe four years' high school work, with three years of professional work, will make a better veterinarian than an eighth grade man, as we used to have, with four years of professional work. Too many of them take up this kind of work without the fundamental training to help them out. The subjects that are mentioned by Dr. Havner, I see, are required in some of our state schools. Iowa, for instance, gives a good portion. Ohio puts it in its curriculum, but does not require it. I think it is elective. I believe it ought to be required because it makes better men. The stockman has more respect for you if you talk with him in his own language, can give him some advice on feed and feeding, and if you are a good judge of live stock, if you can select a good breeding animal; if you show some knowledge along those lines your business will be better.

PRELIMINARY REPORT ON ULCERATIVE LYMPHANGITIS IN HORSES OF THE A. E. F.*

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and
First Lieutenant A. C. WIGHT, Vet. Corps, Vet. Base Hospital No. 6.

Under the heading of "Ulcerative Lymphangitis" we have grouped several pathological conditions, very similar in clinical appearance, which affect principally the limbs of horses and mules. Although we are uncertain as to the correctness of the term "Ulcerative Lymphangitis," it is the one which has been adopted by our French confreres, so, for the sake of uniformity, the term is retained.

*This article was prepared in July, 1918, but could not be published at that time. Changes in personnel prevented continuance of the work as planned.—Aubrey H. Straus, Assistant Professor of Bacteriology, Medical College of Virginia, Richmond. Virginia.

This disease has appeared among the horses of the United States army in France and has assumed such proportions, with a resultant loss of horses from the front, that a thorough investigation from a bacteriological standpoint, in the hope of finding some means of limiting the spread and of further improving the methods of treatment, was considered advisable.

The two classical forms of acute, contagious lymphangitis—that is, epizoötic lymphangitis and ulcerative lymphangitis, the latter type due to the bacillus of Preisz and Nocard—have frequently been encountered and recognized. Our attention, however, was speedily directed to another form, which we have now come to recognize as a predominant, in which neither the cryptococcus of Rivolta nor the Preisz-Nocard bacillus was to be found. Streptococci were found in sixty-one per cent of the thirty-six horses examined by us; no other organism of any significance being found in these cases.

All of the cases of ulcerative lymphangitis studied by us had been infected also with generalized mange. In addition to this, there were received from the surgical ward from time to time a number of cases in which the lesions of ulcerative lymphangitis appeared along lymphatics following an injury or an abscess.

Our observations have led us to believe that the portal of infection is either (a) through a break in the continuity of the skin, as is present among the lesions of mange, or (b) following traumatism. We have not been able to demonstrate the mode of transmission of the infective agent, but we believe it is by direct or indirect contact.

Ulcerative lymphangitis nearly always attacks the limbs, usually the posterior. The first symptoms noticed are a more or less pronounced swelling lameness and a slight rise in temperature, which may remain for several days before ulcerative lesions appear. There appears, nearly always below the hock or knee, a prominent, well-defined swelling, varying in size from that of a pigeon's egg to that of a hen's egg or larger. Clipping of the hair over the lesions shows a reddish swelling, immobile and elastic in pressure. There is little free pus, but usually a sero-sanguineous exudate. Necrosis takes place at the center of the swelling, leaving a deep ulceration with irregular borders, to which are attached threads of necrotic tissue. The lesions occur on all parts of the limbs, but particularly in the region of the pastern, cannon and fetlock. In some cases there occur later in the disease one or more large abscesses along the chain of

lymphatics, at various levels from the hock to the lymph glands. These secondary abscesses, upon discharging, yield an abundance of creamy pus. Specimens for bacteriological examination were taken both from the initial lesions and, where found, from the large secondary abscesses.

When culturing for bacteriological examination, the ulceration, including the surrounding area, is first thoroughly cleansed with some soapy disinfectant, as Liquor Cresolis Compositus. Sterile swabs are then used, inserting the swab as deeply as possible into the base of the ulceration. Cultures taken in this manner rarely show contamination, the causative organism being obtained in most instances in practically pure culture. In some instances, where feasible, the pus itself was collected from a freshly opened abscess, but cultures made from the swabs were quite as satisfactory.

In the first cases examined cultures were made on many varieties of media, including tubes for anærobic growth. White mice and guinea pigs were also inoculated with material direct from the horse. After noting the results from this work, the following rather simple technique has been evolved and has proven entirely satisfactory. Cultures are now made only on whole blood agar plates and in dextrose bouillon. These two media, together with slides of the pus stained by the method of Gram, disclose, we believe, in every instance the causative organism.

Cultures from thirty-six horses were examined. The predominating cause, as previously mentioned, was the streptococcus, twenty-two of the thirty-six horses examined showing the presence of this organism in almost pure culture. This streptococcus grows rapidly in dextrose bouillon, producing long chains and acidity; on blood agar small actively hemolytic colonies are produced, rendering its isolation very simple. Most of the strains so isolated proved virulent for guinea pigs, producing a large abscess at the site of inoculation, followed in some instances by abscesses in the lymph glands draining the site of inoculation. Owing to the scarcity of rabbits and white mice, very little work was done with these laboratory animals. We were unable in any of these twenty-two cases to find any other organism which would account for the infection. A few staphylococcic colonies occurred on some of the plates, but they were few in number and non-pathogenic for guinea pigs.

Four of the thirty-six horses examined were infected with the bacillus of Preisz-Nocard, three of them being so badly infected as to be considered incurable, while the fourth will probably recover. This organism was found in pure culture in the three severe cases and in a mixed infection in the fourth case. The virulence of all of the cultures was proven, the pigs inoculated dying in from fifteen to forty-eight hours following intraperitoneal injections and developing large abscesses following subcutaneous injections. This organism grows very poorly in bouillon. On whole blood agar dry, whitish, opaque colonies are formed; an increasing area of hemolysis is gradually formed around these. These colonies are easily distinguishable and, after a little experience, the morphology of the organism and the appearance of the colonies permit of a diagnosis being made in twenty-four hours. The organism on solid media gives a very dry growth which does not emulsify. The organism is Gram positive and very pleomorphic; granules and striations also occur. The bacilli are generally found in the slides made from the original pus, but not regularly enough to enable a diagnosis being made in this manner.

Of the ten remaining cases one proved a staphylococcic infection, four were found to be glanders and in five the cryptococcus of Rivolta was found. The latter was not found by culturing, but was readily distinguished on the slides made from smears directly from the lesions.

TREATMENT EMPLOYED.

This has consisted in the first place of a thorough cleansing of the field by shaving the hair and local disinfection. Many different lines of local treatment have been tried, among which may be mentioned surgical ablation, opening and curetting of the abscess, cauterization, etc. At present the routine treatment consists in opening the abscess, then curetting, followed by daily applications of dry antiseptic dressing. This is followed by cauterization of the excessive granulations. By these methods alone we have been able in the majority of cases to heal the initial lesion, but, unfortunately, in spite of the improvement in the initial lesion, secondary lesions occurred in nearly all cases.

In the hope of preventing, or at least diminishing, the tendency to the formation of secondary abscesses and relapses, we have tried vaccine treatment in the cases of streptococcic and staphylococcic infection. With the first horses studied auto-

genous vaccines were prepared and used. Later stock vaccines containing from four to ten strains of streptococci were employed. The streptococci were grown in dextrose bouillon for twenty-four hours, killed by heat (fifty-six degrees for one hour) and diluted with physiological salt solution to approximately one billion to the cubic centimeter. The vaccines were preserved with carbolic acid, five-tenths of one per cent.

By the use of this vaccine we have obtained a marked diminution in the number of relapses; in fact, we believe from our experience that, with a prompt diagnosis, proper local treatment as indicated and the administration of vaccine that secondary ulcerations in the streptococcic infection will rarely occur.

After trying various doses we are using the vaccine at present as follows:

First day	1 ½	billion
Second day	2	billion
Third day	2 ½	billion
Fourth day	3	billion
Fifth day	3 ½	billion
Sixth day	4	billion
Seventh and successive days, continuing with, until discharged as cured	4	billion

TYPICAL CASES.

No. 82, black gelding, admitted to hospital January 27 with numerous lesions on the right hind fetlock. Placed on local treatment February 15. Lesions smaller but not healed. Not much swelling in the leg, some excessive granulation. February 19, granulations cauterized. February 27, new prominent abscess size of hen's egg on upper right hind cannon, anterior internal surface. This abscess was firm and painful. It was opened and the necrotic center removed, local treatment also being used. March 8, cultures were made from this abscess and streptococci obtained in practically pure cultures. This streptococcus was virulent for white mouse, killing in thirty-six hours. It also produced a large abscess in a pig at site of inoculation, from which the organism was recovered. An autogenous vaccine was prepared and its use begun on March 11. April 15, horse nearly healed and no further relapses. April 18, autogenous vaccine discontinued and stock vaccine begun. April 26, discharged as cured. May 10, still in good condition.

No. 24, sorrel gelding. February 27, intense lymphatic swelling of the right hind leg. Very painful on pressure and marked lameness. March 1, a chain of abscesses appeared along the internal aspect of the limb, extending from the fetlock to the

inguinal region, following the line of the lymphatics. The abscesses were opened, a thick, creamy pus being evacuated. Local antiseptic treatment was applied. March 6, large abscess in right inguinal gland opened and cultures made. Steptococci present, but pure cultures were not obtained directly from the pus. Some of the pus was injected into a guinea pig and a large abscess developed. From this a hemolytic streptococcus was obtained in pure culture, no other organisms being found. The pig continued to develop abscesses one after another, finally dying after two months. March 18, cultures were again made and this time the streptococcus was readily found and isolated by the technique now used. March 22, use of autogenous vaccine begun. April 13, killed as incurable. This horse was selected for study on account of the severity of the infection, no cure being anticipated.

No. 56, bay gelding. This horse had been under treatment for mange and was considered cured. March 26, an intense lymphangitis of the left hind leg was noticed. March 29, an abscess evacuating reddish pus opened spontaneously on the outer distal third of the left hind cannon. Cultures from this abscess showed the presence of staphylococcus aureus in pure culture. This culture produced a large abscess at the site of inoculation in pig from which the culture was recovered. An autogenous vaccine was prepared. April 3, injections of the autogenous vaccine commenced. April 16, lesion entirely healed and swelling of leg markedly reduced. May 2, no relapse. Leg normal size and horse discharged as cured. Conclusions:

Horses examined	36
Streptococci found in	22
Cryptococcus found in	5
Bacillus of Preisz and Nocard	4
Staphylococcus aureus	1
Excluded as glanders	4

Second—As seen from the above table, the streptococcus is, as far as our observations have been carried, the organism to be regarded as the most frequent cause of ulcerative lymphangitis. This may not be true in many outbreaks but is undoubtedly true in the one studied by us.

Third—Clinical appearance alone is generally not sufficient to enable one to distinguish the different types of lymphangitis. Therefore if this disease is to be controlled we believe that a bacteriological diagnosis should be made on every horse as soon as received at the hospital. This is of importance, as we believe from work now being carried on that cross infections frequently

occur. In making the diagnosis it is of the utmost importance to first exclude glanders by use of the mallein and complement fixation tests.

Fourth—Vaccine treatment in the streptococcic type of infection has, in our opinion, proven successful in preventing secondary abscesses when combined with the proper local treatment. Among the cases studied so far relapses, where formerly the rule, have been found to occur rarely.

THE DIAGNOSIS OF FOWL CHOLERA AND FOWL TYPHOID INFECTIONS IN DOMESTIC BIRDS.

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There are present in this country, as well as in Europe, several diseases of poultry and of other bird species which are difficult to diagnose on the basis of the clinical features and the postmortem appearances alone; and diseases in which the recognition of the bacterial agent, even when discovered, is sometimes by no means a simple procedure. The diseases in which such confusion exists are found predominantly in poultry and in pigeons, although they may appear in other avian species. By poultrymen they are usually referred to as ''cholera,'' an appellation which covers a multitude of maladies. Among pigeon fanciers the term ''megrims'' probably also covers a varied assortment of diseases so far as the actual etiologic agent is concerned. It therefore seems desirable that our views on the nature of the various infections embraced under these heads should be clarified and that we should possess some serviceable means of definitely differentiating the maladies by resort to observation of the clinical features, the postmortem appearances and the nature of the causative agent. It is the aim of the present contribution to give in a summarized form some of the results of several years' study and observation by the author on some of these avian diseases, and especially on the maladies popularly known as ''fowl typhoid'' and ''fowl cholera,'' since it is these two that are most frequently confused, not by the poultrymen alone, but often by the bacteriologists as well. The chief difference between these types of infection may best be presented in the following table:

THE DISEASE.

FOWL TYPHOID.	*FOWL CHOLERA.*
Pathogenic changes highly variable.	Pathogenic features fairly constant.
Exudative or hemorrhagic symptoms, or both, are common.	Hemorrhagic symptoms most prominent, except in lungs.
Pericardial exudate (serous or fibrinous) common.	Pericardial exudate not common.
Leukemic condition often present.	Leukemia not present.
Degeneration of liver capsule common; liver enlarged.	Liver lesions limited to punctiform hemorrhages or slight parenchymatous degeneration; not enlarged.
Skin of breast reddened along keel.	Breast area not reddened.

THE CAUSATIVE AGENT.

FOWL TYPHOID	*FOWL CHOLERRA.*
Seldom present in blood in great numbers before death.	Always present in blood in great numbers.
Often absent from liver and spleen during disease.	Always present in liver and spleen.
Frequently attain length of 1.5 to 2.0 microns in media.	Seldom more than 1 micron in length, usually 0.6 to 0.8 microns.
Marked variability in size of rods.	Slight variability in size of rods.
Distinctly oval in young cultures and when fresh from tissues.	Distinctly short rod in shape.
May be gram-positive when fresh from intestinal content.	Always gram-negative.
Organisms stain peripherally.	Organisms stain more strongly at poles.
In blood occurs commonly as a diplobacillus or in short chains.	Seldom appears as a diplobacillus or in chains.
Young cultures (agar) may show long filaments.	Seldom if ever shows long filaments.
Old cultures show no viscous sediment.	Old cultures show heavy viscous sediment.
Grows well in ordinary media.	Seldom grows luxuriantly in ordinary media.
Grows well on potato.	No visible growth on potato.

BIOCHEMICAL.

FOWL TYPHOID	*FOWL CHOLERA.*
Produces terminal alkaline in litmus milk.	Does not change reaction of milk in 150 days.
Renders milk translucent.	Does not make milk translucent.
Produces acid in dextrin, dulcit, maltose in five days or less; does not ferment saccharose.	Produces no acid, or trace only, in these sugars, but produces (usually) acid in saccharose.
Cultures may give positive methyl red test (maltose infusion broth).	Cultures give negative methyl red test.
Cultures do not form indol nor reduce nitrates.	Cultures form indol and reduce nitrates.
Organism shows many variants biochemically.	Organism shows few variants.
Cultures usually produce H_2S.	Cultures do not produce H_2S.

TOXICITY AND VIRULENCE.

FOWL TYPHOID.	*FOWL CHOLERA.*
Culture filtrates may be highly toxic in small doses.	Culture filtrates give no toxic effects.
Organisms only moderately virulent (except at height of epidemics).	Organisms highly virulent (aggressive).
Cultures become attenuated with considerable rapidity.	Cultures retain virulence with considerable tenacity.
Organisms contain a definite endotoxin and possibly an exotoxin.	Organisms contain neither endotoxin nor exotoxin in the strict sense.
M. L. D. for rabbits usually large.	M. L. D. may be from one to four organisms.

SEROLOGICAL REACTIONS.

FOWL TYPHOID.	*FOWL CHOLERA.*
Agglutinates homologous antigen in high dilutions.	Agglutinates its homologous antigen seldom higher than $\frac{c}{320}$
Agglutinates *Bact. pullorum* antigen in equal dilutions.	Serum does not agglutinate *Bact. pullorum* antigens.
Cultures are agglutinated by *Bact. pullorum* serum.	Cultures are not agglutinated by *Bact. pullorum* serum.

IMMUNOLOGICAL REACTIONS.

FOWL TYPHOID.	*FOWL CHOLERA.*
Organisms are opsonized and phagocyted in immune animals.	Organisms are phagocyted to a slight extent only in immune animals and seldom in normal animals.
Animals can be immunized with difficulty by use of killed cultures.	Animals can be immunized only slightly if at all by killed cultures.
Animals can be immunized with difficulty by use of living attenuated cultures.	Successful immunization by means of living cultures is rare.

In connection with this table no special comment is necessary except in the case of pigeon inoculations. It has long been regarded a diagnostic test of the fowl cholera bacillus to obtain in the needle-tract, following the intramuscular inoculation of a pigeon, an area of yellow necrosis. It can scarcely be doubted that this reaction is characteristic of *B. avisepticus*. But the important point to observe is that essentially the same reaction may be called forth by the injection of other bacterial cultures, and notably by inoculation with certain members of the paratyphoid group, especially the subgroup which are anærogenic, such as *B. gallinarum*. In the case of many of these strains the necrosis is not so much yellow as it is grayish-yellow or grayish; but the difference between this and the *straw-yellow* of *B. avisepticus* is sometimes difficult to detect. From these data one may conclude that to diagnose a fowl cholera infection only on the grounds of a pigeon-inoculation, as is sometimes done, is by no means a safe procedure.

Taking into consideration all the differences between the two diseases, or their agents, mentioned in the table, the writer would recommend the following tests as affording the most rapid diagnosis of a suspected case of fowl cholera. The points may be grouped under the heading of (1) a presumptive diagnosis and (2) a conclusive diagnosis.

PRESUMPTIVE DIAGNOSIS.

1. Organism less than 1 micron in length and not predominately in pairs; numerous in heart's blood and in all the organs of the body.

2. Pigeon inoculation (intramuscular) results in death in eighteen to forty-eight hours, and upon autopsy shows straw-yellow necrosis along the needle tract in the breast muscle.

CONCLUSIVE DIAGNOSIS.

1. No growth on potato.
2. Viscous, ''swirling'' sediment in broth cultures after four to six days.
3. Does not change reaction or consistency in litmus milk cultures.
4. Cultures form indol and reduce nitrates, but do not produce H_2S.
5. Cultures ferment saccharose with slight acid-production, but do not ferment significantly maltose, dextrin or dulcit (only one need be employed for the test). Cultures do not ferment arabinose.

But all poultry diseases of the fowl cholera or fowl typhoid type, when judged by clinical features alone, are not necessarily fowl cholera or fowl typhoid. It now seems well established* that organisms of the paratyphoid B. type, similar in important respects to Schottmuller's *B. paratyphous* B, may occasion epidemics not only in poultry but in pigeons and in song-birds. It also seems probable that we must regard the paracolon organisms as playing a similar pathogenic role in birds. These organisms have been described from time to time in relation to poultry diseases and the present writer has made a study of several that manifestly belong to these groups. These paratyphoids and paracolons from poultry may be separated from one another by the same means that are used for the separation of the paratyphoid from the paracolon bacteria in the case of higher animals.

They may be separate from the anærogenic paratyphoids (next to be mentioned) as shown in the accompanying table.

*See Bulletin 174 of the Agricultural Experiment Station of the Rhode Island State College, 1918, pp. 4-216.

TABLE I.

PRESENTING SOME OF THE ESSENTIAL BIOCHEMICAL DIFFERENCES BETWEEN SOME OF THE PATHOGENIC BACTERIAL SPECIES FROM POULTRY.

Name of Bacterial Species	Fermentation of									
	Xylose	Maltose Dextrin Dulcit	Saccharose	Indol	Nitrate Reduced	H_2S Formed	Milk Alkalined	Milk Made Translucent	Viscous Sediment in Broth	Aerogenic
B. paratyphosus B	+	+	—	—	—	+	+*	+	—	+
B. paratyphosus A	—	+	—	—	—	—?	+†	—	—	+
Paracolon bacillus	+	+	—	+	+	+	—	—	—	+
B. gallinarum	+	+	—	—	—	±	+*	+	—	—
B. pullorum A	±	—	—	—	—	+	+†	—	—	+
B. pullorum B	±	—	—	—	—	+	+†	—	—	—
B. avisepticus	±	—	+	+	+	—	—	—	+	—

* Rapidly (6-10 days).
† Slowly (5-9 weeks).

In addition to these maladies there are other diseases in poultry in which one finds, as causative agents, a small group of three very closely related bacteria. Two are of the anærogenic paratyphoid type, the other aerogenic. The diseases are (1) bacterial white diarrhœa of chicks, (2) *Bacterium pullorum* infections of adult fowl and (3) the so-called fowl typhoid, caused by *B. gallinarum* E. Klein (=*Bact. sanguinarium* Moore). *Bact. pullorum,* which may attack both young chicks and old hens, can be distinguished from *B. gallinarum* in so far as the former does not ferment maltose, dextrin or dulcit with the production of acid; the typical *B. gallinarum* ferments these three carbohydrates. Moreover, *Bact. pullorum* alkalines milk very slowly (like *B. paratyphus* A), while *B. gallinarum* alkalines milk rapidly (like *B. paratyphosus* B).

Bact. pullorum, however, may be subdivided into two types. One produces disease in young chicks only, so far as known at the present time, and is probably always ærogenic; this organism, which corresponds with Rettger's *Bact. pullorum,* has been termed by the present writer *Bact. pullorum* A. The other type of *Bact. pullorum* not infrequently attacks old hens and sometimes causes severe epidemics and considerable loss; the writer has observed three such epidemics in the widely separate parts of this country. This type of *Bact. pullorum* is, however, anæro-

genic, like *B. gallinarum.* It has never been observed by the writer to form gas. Its other fermentative features, however, resemble those of *Bact. pullorum,* viz., it fails to ferment maltose, dextrin and dulcit. This type has been termed by the writer *Bact. pullorum* B. The full significance of the differences between these bacterial types cannot be grasped at the present time, but if progress is to be made in clarifying the paratyphoid group, in its broadest aspects, it is essential that investigators keep such differences in mind pending further study of the organisms concerned.

And finally it may be said that besides the fowl typhoid type, the fowl cholera type, the pullorum A and B types, the paratyphoid and paracolon types, there exist several other bacterial species which differ from any of the above, which are found only occasionally as the causative agents in poultry disease and whose systematic position is not yet fully ascertained. For example, the writer has described elsewhere three new bacterial species, all causative agents of disease in birds, and sometimes the etiologic factor of destructive epidemics. These are, respectively, (1) *Bact. jeffersonii,* doubtless one of the anærogenic paratyphoids, but differing in important features from other members of the group; (2) *Bact. rettgerei,** a salicin-positive organism calling forth a fowl-cholera-like disease in poultry, and clearly lying outside the paratyphoid group; and (3) *Bact. pfaffi,* another salicin-positive type, originating in an epidemic among canaries (Pfaff) and also lying outside of the strict paratyphoid group. These three organisms can be differentiated most easily by their fermentative features, which may be summarized as indicated in the accompanying table.

* Isolated by Rettger in 1909.

TABLE II.

SHOWING ESSENTIAL FERMENTATIVE DIFFERENCES IN THE THREE NEW PATHOGENIC BACTERIAL SPECIES, AND A COMPARISON WITH *B. AVISEPTICUS.*

Culture No.	*Designation*	Arabinose	Maltose	Dextrin	Dulcit	Adonit	Salicin	Saccharose	Lit. Milk
16	*Bact. jeffersonii*	+	+	+	+	—	—	—	Alk.
50	*Bact. rettgerei*	—	—	—	—	+	+	—	Alk.
96	*Bact. pfaffi*	+	+	+	—	—	+	—	*
48	*B. avisepticus*	—	—	—	—	—	—	+	*

* No change.

It should be added that these three organisms show no antigenic relationship with one another or with other known bacteria from poultry. They agree in the following points: (1) short rods, (2) non-motile, (3) gram-negative, (4) no polar staining, (5) non-liquefying, (6) indol not formed, (7) nitrates not reduced, (8) grow well on potato, (9) flocculent sediment in broth, (10) filtrates non-toxic for rabbits. Although the writer has observed the occurrence of *Bact. jeffersonii* and *Bact. rettgerei* only once, it is to be borne in mind that they were both isolated originally from "fowl-cholera-like" diseases. For this reason it would seem desirable that all cultures obtained from such poultry epidemics should be examined with some care to ascertain the frequency with which these new species may occur in the flocks of this country. *Bact. pfaffi* came from Europe and has not been observed by the writer in any American bird species.

SUMMARY.

It is the purpose of this paper to present the essential differences between the two poultry diseases, fowl typhoid and fowl cholera, with special reference to (1) the nature of the disease process and pathological alterations in the organs and tissues, (2) the causative agents *(B. gallinarum* and *B. avisepticus)* and their biochemical features, (3) their toxicity or virulence, (4) their serological reactions and (5) their immunological reactions. Also the differential characteristics of *B. gallinarum, Bact. pullorum* A and *Bact. pullorum* B are presented. In addition, there are mentioned three new species of bacteria pathogenic for birds *(Bact. jeffersonii, Bact. rettgerei* and *Bact. pfaffi)* and their distinctive biochemical features described.

PROBLEMS IN ANTHRAX CONTROL.*

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The history, etiology, symptomatology and pathogenic anatomical changes in anthrax is a familiar story. It is therefore unnecessary to reiterate these items so generally understood. However, experience in the successful control of recent extensive epizoötics convincingly supports certain facts or ideas which have heretofore either been unrecognized or at least not given their proper emphasis.

* Presented at recent meeting of the California State Veterinary Medical Association.

The role of the insect-carrier in connection with the spread of anthrax is now considered a fact, established, and its importance is properly magnified by recent observations. The growth of the rice industry and consequent flooding for long periods of a large percentage of the total acreage in certain sections of the state provide the ideal condition of grass blades over water for the multiplication of the large black horse fly *(Tabanus atratus)*. The superabundance of these pests as compared with former years in rice-growing districts, indicating that they are making the most of the opportunity thus presented; the fact that they attack animals in immense numbers as soon as they become too sick to fight, piercing the peripheral capillaries known to be teeming with anthrax bacilli during the last hours before death; the probability that these flies will leave the carcass of the sick animal soon after death to immediately pierce the skin of a healthy animal with a proboscis shown to be infected with anthrax bacilli by laboratory examination; all strongly emphasize the possibility of spreading the disease rapidly and greatly augmenting the losses in these communities. On the other hand, the fact that these greater losses do occur in the rice belt; that it is almost always among cattle and horses that the losses occur, while sheep, protected by their wool, go unaffected; that in horses there is often carbuncle formation, indicating local inoculation, and that in cattle there is quite a general tendency for only one or a few animals to be lost in a herd at first, followed in a few days by the almost simultaneous loss of several head; all indicate that this insect, the black horse fly, is actually guilty for the greatly increased losses from anthrax in recent years. Mosquitoes and other flies manifestly may play a similar role to a less extent.

It would be a regrettable circumstance if the growing rice industry and the old-established live stock industry should prove incompatible. The hope of maintaining both in the same community apparently lies in suitable methods of prophylactic immunization. This will be discussed presently.

In country that is naturally boggy, and in areas flooded by surplus water from rice fields, conditions for live stock raising may be greatly improved by drainage, or flooding the surface of worthless sloughs with crude oil.

Hot weather seems to exercise a peculiar predisposing influence, rendering animals especially susceptible, since it has been recognized that measures of control only overtake the spread of an epizoötic with the advent of cooler weather. There has been an

inclination to explain this by associating it with feed shortage, for it is true that during the extreme dry, hot weather feed is shortest and animals are forced to eat closer, increasing the probability of ingesting spores and injuring gums; also at this time they are attracted to feed in wet places where grass is green and anthrax spores abound. These theories, however, do not explain all the circumstances, for in the California outbreak of 1917 the disease continued to spread to new territory until the advent of cooler weather, which was not, however, accompanied by rains which could have improved pasturage, nor was it sufficiently cold to stop the activities of the flies. Again, in the case of the outbreak in 1918, a rain and cooler weather in late summer were accompanied by an immediate check in deaths, which was noticeable before it was possible for the grass to have grown sufficiently to improve feeding conditions. It, therefore, appears that sweltering hot weather, by its effect on the cattle, is itself a promoting factor in an anthrax epizoötic. The vegetation and rapid growth of the anthrax organism during very hot weather may be partially accountable, also, when the outbreak exists on boggy lands. While this is true, it does not mean that anthrax does not occur in cold weather, for a severe outbreak has recently occurred in mid-winter above an altitude of four thousand feet. Since, however, we are unable to exercise any control over weather conditions, this observation is of chief significance in connection with prognosis of an outbreak.

Thorough cremation of carcasses should always be insisted upon as one of the most potent means of preventing future losses. It is understood that putrefaction will destroy anthrax bacilli and it is recognized that probably, due to this fact, anthrax is not more widespread than it now is, but particles of blood and infectious material may become dried or otherwise escape putrefaction. It is therefore not sufficient to trust to the natural processes and even if the carcass is buried spores may later be brought to the surface by earth worms, burrowing animals or erosion. On the other hand, carcasses that have been thoroughly burned can never exist as future menace. Also, if suitable material is available, cremation may be accomplished at much less expense than burying, which is contrary to the general belief. This is because the proper method of burning is not generally adopted. Either moist stable manure or a damp, partially decomposed hay or straw stack bottom may be used. A whole load should be applied to each carcass on the ground where it

dropped, thereby completely covering it. A small quantity of coal oil may be used to thoroughly start the fire, which will burn for three or four days. At the end of this time the bones of the cadaver may be pulverized with the fingers, or found to have entirely disappeared. If a number of carcasses are burning in a field it is well to visit them all each morning with a load of manure, applying to each of them, if necessary, enough to cover an extremity or part that may have been exposed by the burning process. This will be found to be the most simple, efficient and inexpensive method for disposition of carcasses, and once adopted is used with satisfaction to all concerned.

To quarantine an infected herd on infected premises is not always the correct procedure, for experience has demonstrated that by this means anthrax on premises yielding mass infection can never be controlled. Repeated trials have also demonstrated that it is impossible with any vaccine now available to establish a high enough active immunity to prevent losses under such conditions. Not that cattle should be moved upon the highway undirected, to whatever point they may desire when deaths are constantly occurring, but, rather, that they may be moved when losses are temporarily checked by the administration of large doses of serum or from natural causes, under strict supervision, and to a point predetermined to be agreeable to all parties concerned. The herd must at all times be kept under close observation and, should a sick animal appear either on the road or at the point of destination, it should be destroyed immediately and burned. A stock owner who is losing animals at the rate of about five a day, after every possible method of vaccination has been applied, can be depended upon to find a suitable point of destination. To hold him to such infected premises by quarantine regulations is injustice to the owner and defeating the best interests of the community by forcing a condition under which it is impossible to stop the death of cattle which is certain to spread.

In herds affected with anthrax and in which deaths are occurring at the time of treatment the use, simultaneously, of anti-anthrax serum and spore vaccine offers the most successful and rational means of checking losses, this being supplemented when practicable by administering 50 c.c. doses of serum to animals carrying temperatures of 104°F. or above and larger doses to those manifesting visible symptoms.

From a purely theoretical standpoint, the administration of attenuated anthrax spores, to be followed in about four days by

the use of specific serum, would seem to offer a means of obtaining better results. However, there are no available data in support of this method. Experiments are therefore necessary to establish its safety and an extensive field trial to determine its value. The method appears worthy of development.

Spore vaccines should never be administered alone to herds in which infection is imminent, as a period of reaction follows their use, known as the negative phase, during which resistance is much lower. The disease is therefore augmented by their use, rather than prevented. Veterinarians should universally recognize this simple, fundamental principle of serum-therapy, for undoubtedly the thoughtless, indiscriminate use of these products, because they bear the name of vaccine, has in many cases been the means of inducing a severe outbreak which, if left to its natural course, would have been but a mild attack.

The simultaneous serum-spore method is not well adapted for use as a prophylactic, for the simple, good reason that as high a degree of active immunity cannot be established by this means as by another. The use of anti-sera, with attenuated anthrax spore vaccine, in connection with the production of an active immunity may well be considered as contra-indicated because its use prevents a good reaction necessary for the production of such immunity, and field experience demonstrates that a real protective degree of immunity following its use is short-lived.

The use of single spore vaccination should also be discouraged. While it must be admitted that some degree of immunity follows its use, it is of little real practical value, for in anthrax territory, if a ranch is known to be infected, infection exists in the great majority of instances to such an extent that a comparatively low immunity will not prevent losses.

Double spore vaccines, No. 1 and No. 2, are to be recommneded above all other *available* products for the production of active immunity in cattle. If a potent triple spore were produced it would doubtless be even better. The arguments usually directed against this method are that it necessitates handling the cattle twice at a consequent greater expense. It is, however, just as necessary that suitable pens and chutes be provided for one vaccination as for two. The real stockman has his ranch help employed regularly, some of whom devote most of their time to the live stock. Then, another day or part of a day devoted to a second vaccination would not appear to involve any great amount of expense from that source. The veterinarian's fee would be

offset by saving a single animal. It is therefore evident that the double-spore method, which offers some real protection, demands universal adoption, over other methods now available, as the prophylactic agent for anthrax; inasmuch as the actual losses prevented much more than justify its use in preference to a single injection of spores at somewhat less expense and inconvenience, and little protection; and in preference to a simultaneous serum-spore injection, with which, perhaps, the expense is just as great, the danger not proven to be less, and a very short period of effective immunity produced.

One fact further in connection with vaccination for anthrax control must be emphasized: never should a living vaccine be applied to animals in non-infected territory. To begin with, there is no excuse for using them; nothing to be accomplished by so doing. It must, further, be considered as malpractice, for it actually is associated with grave danger and most serious consequences. It is known to be a certain means of establishing new centers of infection and must sooner or later result in discredit to the profession and to biologics, which, used under justifiable conditions, are of much real vaue. This discredit may ripen into popular hysteria, which possibly may bring about the complete prohibition of their use, or, certainly, most stringent regulations, accompanied by license fees and high guarantee of ability for their application.

In connection with our field work, it is often considered desirable to confirm a diagnosis of anthrax by a laboratory examination, or to appeal to the laboratory for aid in establishing diagnoses in doubtful or atypical cases. To do this the laboratory must have suitable specimens. Time, temperature and moisture are the essential factors to be overcome in sending specimens, for these factors determine putrefaction. It has been remarked elsewhere that putrefaction destroys anthrax bacilli. Therefore negative laboratory findings are to be expected from old putrefied specimens and are never conclusive.

The most suitable ways of sending specimens consist of:

(1) Making a smear of blood from peripheral vessel or spleen pulp on a perfectly clean piece of glass; allow it to thoroughly dry in the air, not in direct sunlight and without heating. This may then be wrapped in cotton and forwarded for both cultural and miscroscopic examination. Do not place slides together with a quantity of blood between, as this will dry in transit, sticking

the glass together so firmly that they must be broken apart by force with consequent danger to the laboratory worker.

(2) A piece of clean, sterile gauze dipped in blood and allowed to dry in a similar manner is a good specimen. Positive results have been obtained in a specimen of this kind even after fourteen months.

(3) A few drops of blood drawn with a sterile syringe and transferred to a small sterile bottle or vial and sealed make a very desirable specimen.

(4) The farmer's method: Cut off an ear. This has been recommended because it is far removed from the digestive tract and is consequently not reached by invading putrefactive bacteria quite so quickly, and because the cartilage tissue of an ear does not readily putrefy. If this method must be adopted, therefore, do not remove also a pound of flesh to rot in transit; do not force it into a fruit jar from which it cannot be removed without breaking and do not wrap it first with a layer of absorbent cotton, which will draw all of the blood from the specimen. Cut off the ear about three-fourths of the way from its tip; wrap first in paper and then in cotton and always send material suspected of being pathogenic well wrapped, by express, since it is prohibited from the mails by United States postal regulations, unless sealed and soldered.

Several shipments of preparations sold as remedies for hog cholera and other diseases of hogs have been found in interstate commerce by federal food and drug inspectors and seized upon orders of the federal courts on the charge that these preparations were falsely and fraudulently labeled, according to a statement of the officials of the Bureau of Chemistry, United States Department of Agriculture, who are in charge of the enforcement of the food and drugs act. The Bureau of Animal Industry coöperates by supplying information regarding locations where these products have been used, the bad results following their administration, etc., and then furnishes affidavits and expert testimony as to the merits of the preparations.

The Ohio State Veterinary Alumni Association dedicates its March Quarterly to the memory of Dr. H. F. Detmers, founder and first dean of the College of Veterinary Medicine of the university.

CLINICAL AND CASE REPORTS.

FILARIA IMMITIS IN DOG'S HEART.

J. F. RYAN, Lagrange, Illinois.

An English bulldog, eight years old, weighing about fifty pounds, was brought to me in August, 1918, to care for until the owner returned from his vacation. The animal appeared to be in perfect health up to the eighth day. I found him very weak and depressed, tottering in his walk, was hardly able to get up four or five steps on the verandah. I suspected too much heat, as we were having a hot spell in the high nineties. On closer examination I found a most irregular pulse, dropping four and five beats at a time, temperature 102°F. Gave him a stimulant (aromatic spirits ammonia, one dram, in one ounce of water); he became weaker during the day, being unable to stand on hind legs by evening. A couple of hours later he began to moan and whine, appeared to be suffering a great deal of pain. Gave him a 1/16 of morphine, which eased him until 5:30 a. m., when he again whined. I found him unable to rise and apparently suffering intensely. Gave 1/16 morphine. He died three hours later. I suspected some form of heart trouble. Made autopsy. All internal organs appeared normal, even the heart. On opening the right auricle I noticed an antemortem clot in the valve. On removing it a long, thread-like worm came away with it, the longer part extending into the ventricle. It measured eleven and one-half inches. I recognized it as a *Filaria immitis*.

These worms are rather common in the South and the tropics. I never have heard of them being found in this latitude.

This dog was born in New Jersey and never lived elsewhere until he was brought to Lagrange, Ilinois.

GID IN SHEEP.

I. E. NEWSOM, Fort Collins, Colorado.

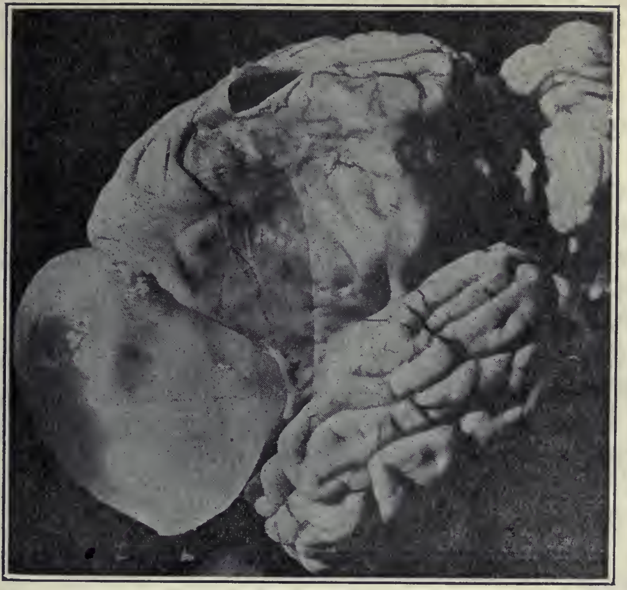
This case is reported largely for the purpose of establishing an accurate record of the presence of the Gid parasite in Colorado since Hall, in the Bureau of Animal Industry circular 193, published in 1912, makes the following statement: "The parasite has been reported apparently correct from Ohio, Illinois, Michi-

Sheep Infested With Gid Parasite.

gan, Missouri, Kansas, Indian Territory and Nevada, but there are doubtful records from Utah, Colorado and Tennessee.''

This band consisted of 1,560 lambs shipped from Montana in December and placed in the feed lots near Fort Collins. It was said by the owner that within a few days after they arrived one or two animals were noticed to be acting queerly. The band was first visited by the writer at the request of Dr. R. N. McCarroll, a local practitioner, early in March. At this time there were some fifteen or twenty head showing cerebral symptoms and two lambs were down in a comatose state. One of them was said to have been down for several weeks. These two lambs were slaughtered and on examination of the brain the Gid parasite was readily discovered. In the head of a sheep that had died four days previously the same condition was found. On a later visit, of two lambs that had died, the parasite was found in one but not in the other. At this time two of the worst affected were brought to the veterinary hospital at the Colorado Agricultural College, one of which is shown in the picture.

No. 1 was operated by Dr. H. E. Kingman on March 12. On clipping the wool over the cranium a softened area about the size of a quarter was quite noticeable. On account of this it



Brain Showing Presence of Gid Parasite.

was not necessary to trephine. However, on passing through the meninges only cerebral substance appeared. A small trocar was then passed and the bladder was struck about a quarter of an inch deep in the cerebral substance. On enlarging this opening the bladder was readily removed and the operation finished. The patient died on the night of the 13th.

No. 2 was operated on March 13 and here again a softened place was found in the cranium, although the bone had not been entirely dissolved. The operation was successfully performed, but the patient died on the night of the 18th.

It seems probable that there are twelve or fifteen more animals affected in this lot. The symptoms are turning the head to one side and walking in a circle. Finally the lamb goes down and there appear to be days when considerable improvement is noticed, followed by days of coma. The symptoms appear to last anywhere from one week to two or more months.

The fact that these lambs came from Montana is quite significant, since that state seems to be much more affected than any other. For those who care for a more extended discussion of the Gid problem it can be found in the writings of Hall, more particularly as appears in bulletin 125 and circular 165, Bureau of Animal Industry.

THE EFFECT OF "GROUND GLASS" ON THE GASTRO-INTESTINAL TRACT OF DOGS.

N. S. MAYO, Chicago, Illinois.

In the Journal of the American Medical Association for December 28, 1918, Major J. S. Simmons and Lieutenant W. C. von Glahn of the Medical Corps, U. S. Army, report the results of tests on dogs of giving ground glass in the food. These tests were made at Fort Sam Houston, Texas, on ten dogs obtained from the city pound of San Antonio.

The dogs were fed varying doses of five grades of glass, varying in size from "large broken" to "fine powdered." The dose of glass was mixed with 200 grains of lean meat and fed immediately. A careful record was kept of each animal and daily observations were made of the feces for evidence of blood, pus or mucus. Only one dog showed a slight temporary diarrhœa and rise of temperature, after which the feces were negative.

The following quotations give their necropsy findings and conclusions:

"The dogs were killed with chloroform and immediately examined. The postmortem findings were remarkably uniform in the absence of any visible lesions. As the findings were so similar, detailed account of each will be omitted and one protocol given:

> The peritoneal surfaces are smooth and glistening and there is not any excess of fluid in the peritoneal cavity. The omentum contains much fat. The intestines are not distended. The lymphatics are engorged and beautifully marked out, so that they are easily traced from the intestine through the mesentery to the glands. The stomach contains a large amount of undigested food, in which particles of glass are readily discernible. The gastric mucosa is gray and translucent. There is no ulceration nor any evidence of hemorrhage. The intestine contains a moderate amount of digested food in the upper half. The intestinal mucosa is gray and translucent, and there is no ulceration, hemorrhage or exudate present. There are several tæniæ and many uncinariæ present in the lower portion of the bowel. The lungs, heart, spleen, pancreas and liver are negative.

The postmortem findings in the control dogs were identical except for the absence of glass.

For the microscopic preparations from six to twelve segments of the intestine from different portions were removed before the bowel was opened. This was done to avoid the possibility of any trauma to the mucosa while opening the bowel. These segments measured from 5 to 10 mm. in length. The stomachs were opened before the specimens for microscopic examination were removed. The tissue for examination was immediately placed in ten per

cent solution of formaldehyde. The paraffin method was used in the preparation of the material for sectioning.

The findings microscopically were equally negative. The sections from the stomach of each of the dogs and from the control dogs did not show any abnormal changes. The epithelium was intact and there was not seen any infiltration with leukocytes or small round cells of the mucosa, submucosa or muscular layers in some of the sections. From the intestines of four of the dogs (3, 4, 6 and 7) there was seen some denudation of the tips of some of the villi of their epithelium. There was not, however, any exudate on the surface of the villi, or any inflammatory reaction within them. No other abnormal changes could be found in any of the sections. The central lacteals and lymphatics were engorged in those dogs that were examined during the period of active digestion. The gross and microscopic findings were identical on the dog that was given one large dose of glass (50 gm.) and examined postmortem forty-eight hours later.

In both of the control dogs, denudation of the tips of some of the villi of their epithelial cells was observed.

CONCLUSION.

The ingestion of ground or powdered glass has no toxic effect and produces no lesion, either gross or microscopic, on the gastro-intestinal tract of dogs.''

The writer was recently consulted as to the effects of powdered glass on swine. While not able at that time to give a definite answer, the opinion was expressed that it might cause some irritation of the gastro-intestinal tract, but it was doubtful if it would cause death.

Some years ago a case came under my observation where a man was convicted of attempting to kill a neighbor's cattle by placing broken glass in the food. As I recall, no cattle were injured.

The experiments of Major Simmons and Lieutenant von Glahn show that, while ground glass in food appears to be a fearful matter, as a matter of fact it does not have any deleterious effects.

Dr. Charles P. Wilson has recently received his discharge from the army and has resumed practice at Decorah, Iowa.

Dr. H. C. Graham, formerly of the Veterinary Corps, Camp Greenleaf, is now located at Barrytown, Michigan.

COMPLETE PROLAPSE OF THE UTERUS OF A COW.

S. A. Goldberg,
Department of Pathology and Bacteriology,
New York State Veterinary College, at Cornell University, Ithaca, New York.

A three-year-old grade Jersey cow weighing about 800 pounds. She calved apparently normal in the evening and was found dead with a prolapsed uterus the following morning. Autopsy at 3 o'clock in the afternoon.

The external examination showed that the animal was in good condition. The abdominal cavity was greatly distended with gas. The uterus was prolapsed completely and one horn was nearly

Everted left uterine horn showing colyledons and a small part of the remaining fœtal placenta.

entirely everted. This horn was hard toward the body of the animal and the everted sac contained a considerable amount of liquid. On the everted part near the tip there were portions of the placenta adherent to some of the cotyledons. The rest of the everted mucosa was dark red, due to diffuse hemorrhage and to hyperemia.

Internal examination showed a considerable amount of subcutaneous, omental and subperitoneal fat. There were petechiæ and ecchymoses in the subcutaneous tissue over the sternum. On

opening the abdominal cavity a considerable amount of dark red liquid escaped. There were numerous fibrous tufts and ecchymoses on the mesentery.

The wall of the uterus was greatly thickened by œdema. The left horn was nearly entirely everted. It contained about eight liters of dark red liquid, the uneverted right uterine horn, and a large strangulated loop of small intestine. This portion of the small intestine was dark red in color, while the rest of the intestine was normal. On section, the mucosa of the strangulated loop was reddened and thickened. There was a considerable amount of hemorrhage and hyperemia in all the coats of this portion of the small intestine. The fœtal membranes were attached to the cotyledons of the right horn, as well as to those of the uneverted part of the left horn. All the cotyledons, however, were of a dark red color, due to hemorrhage.

The spleen was darker and softer than normal. On section, the pulp was semi-liquid in consistency and of a dark red color. The splenic corpuscles were invisible.

The kidneys were pale and soft. On section, the cortices were yellowish and soft, while the medullæ were congested. The kidneys bulged on section and the capsules peeled easily.

The liver was lighter in color than normal and somewhat enlarged. On section, it bulged and the parenchyma had a sort of cooked appearance.

In the lungs there was an adhesion between the parietal pleura and the left apical lobe. There were reddened fibrous tufts scattered on various parts of the pleura. Both apical lobes were congested and in places they showed small hemorrhages. Both caudal lobes were pale. There were areas of emphysema in various parts of both lungs.

The mammary glands were somewhat congested. This was more pronounced in the anterior quarters. Otherwise the glands appeared normal.

Microscopically, the everted uterine horn showed necrosis of the superficial layers of the mucosa. The epithelial layer was replaced by fibrin, hemorrhage and numerous polymorphonuclear leucocytes. The arterioles and capillaries were greatly distended with blood. In the deeper layers of the mucosa there were numerous polymorphonuclear leucocytes, fibrin, and marked active hyperemia. The glands were slightly degenerated and there was some hemorrhage in the lumina of the tubules. The muscular coats showed marked active hyperemia and few polymorphonu-

clear leucocytes. In the strangulated portion of the small intestines the mucosa showed the epithelium almost entirely gone, but a few glands in the deeper part of the mucosa remained. There was much hemorrhage, fibrin and active hyperemia in the mucosa. The other coats showed hemorrhage and hyperemia.

Media inoculated from the liver gave a growth of *B. coli.* Media inoculated from the spleen gave no growth.

Diagnosis: *Immediate cause of death,* toxæmia or exhaustion.

Fatal illness: Eversion and prolapse of the uterus (diphtheritic metritis). Strangulated hernia of part of the small intestine into the everted uterine horn.

Secondary lesions: Acute parenchymatous nephritis and degeneration of the liver.

HEMORRHAGIC SEPTICEMIA IN HORSES.

JOHN PATTERSON, Hedrick, Iowa.

Hemorrhagic septicemia in horses is a condition about which we are unable to get much first-hand information. Outbreaks are reported, the disease is said to exist, but nothing definite is confirmed. Detailed information regarding the pathology and symptoms are lacking. A great many of the outbreaks are diagnosed symptomatically and no effort made to confirm it in the laboratory.

If this short article will be of any assistance to another practitioner, or if it will stimulate or assist in the further investigation of the disease, the purpose will be accomplished.

This outbreak occurred in the months of February, March and April of 1918. It included eight horses in all—three died of the disease, another, which would have died eventually, was killed for postmortem purposes, and four recovered, as will be noted later.

A few days previous to February 17 two horses had died showing the same symptoms as No. 3, which was sick at this time. On the day before the animal was in the harness all day and ate the usual amount of feed in the evening. Nothing out of the ordinary was noticed by the owner.

The next morning was found down in the barn and unable to rise, pawing and striking continually, nostrils dilated and breathing rapidly, pulse fast and weak, temperature 97.5, bowel movement seemed to be normal.

When placed in an upright position the symptoms were less marked and the animal would eat both hay and grain, as well as drink water from a bucket. When assisted to the feet with slings he would support himself and move about the stall as much as slings would allow. When the animal was down there was trismus of the muscles of the neck and the neck held in the position of lordosis.

At this time the diagnosis was problematical and was withheld.

Treatment in the way of purgatives and stimulants was given.

On the second day following the animal died and on account of the very bad weather only a limited postmortem was held. The blood was dark, with not much tendency to clot. There were numerous small petechiæ on the atria of the heart—large blotchlike hemorrhages beneath the epicardium and on the muscular pillars beneath the endocardium. We consider these lesions as almost pathognomonic of hemorrhagic septicemia in the domestic animals.

The day before this animal died a colt, No. 4, was down in the next stall, unable to rise without the sling, and manifesting the same symptoms as No. 3.

This colt was given 200 mil. of the anti-serum prepared at the state biological laboratory for hemorrhagic septicemia in cattle. The next morning was given 150 mil. more. This colt received no other nor further treatment and in a week's time was turned out to pasture in a nearby orchard.

On March 22, thirty-one days after No. 3 had died, horse No. 5 was found down in the barn early in the morning, but by the time we reached the farm was up eating and apparently all right, since the temperature was normal and no clinical symptoms visible. This, however, was a mistake, for at 3 p. m. the horse was down again and another one, which made No. 6, was also down. This time there was no mistaking, for they both showed the same violent symptoms as seen in the previous animals.

They were assisted to their feet and given an aloes ball and arecoline. When on their feet the symptoms almost entirely disappeared and the same appetite for feed and water was manifested as in the other cases.

On account of the fact that we were unable to get more of the anti-serum from the laboratory, colt No. 4 was bled from

the jugular. The clot was removed and these two cases, Nos. 5 and 6, were given 90 mil. of the serum intravenously. This injecting was done on the next morning after they had taken sick in the afternoon previous.

Both of them were given 60 mil. of the colt serum each day for two days.

On the third day after No. 6 came down sick she was turned out in the lot, apparently as good as ever. At this time No. 5 was still in the sling.

Up to this time all of the animals had been in the same barn. Those that had been getting hay and corn to eat were changed to straw and oats and vice versa. Others had hay and oats, while some had straw and corn.

Two days after Nos. 5 and 6 came down a black filly, No. 7, was found down and unable to rise in a pasture adjoining this barn. She was dragged to the barn on a sled, put in the sling and given the same line of treatment with the colt serum that Nos. 5 and 6 had received. It was necessary to keep her in the sling for about ten days, after which time she was turned out, fully recovered.

About this time the owner was running short of work horses and went to a nearby market, where two aged mares were purchased. This team was stabled in a large shed some 300 feet from the previously mentioned barn and on higher ground. It was also about 100 feet from the pasture in which No. 7 was at the time of taking sick. This mare was on the place just ten days when she came down sick in the same way that the others had done. She was given one dose of 100 mil. of the colt serum and made a rapid recovery in a few days.

No. 5 showed much improvement the first seven or eight days and then began to fail until on the tenth day was unable to support his own weight in the sling. He was killed and a very complete postmortem, which took some three or four hours, was held. The following were the findings: Blood very dark and showed marked hemolysis, petechiæ on mediastinal, prepectoral and mesenteric lymph glands; approximately three pints of straw-colored fluid in the pericardial sac; hemorrhages beneath the epicardium and the very characteristic hemorrhages of the endocardium, which at times seemed to extend into and follow the muscular striations of the myocardium. The entire body was dissected and no other lesions found.

Samples of the blood, pericardial fluid, part of the lymph glands and the entire heart were forwarded to the department of veterinary investigation of the state college for a laboratory diagnosis.

Large numbers of bipolar staining organisms were found in the pericardial fluid. They were not, however, pathogenic for laboratory animals, and would not grow on laboratory media. Whether or not they are pathogenic when found in the animal at this stage, whether or not the treatment given the animal had destroyed their virulency and the animal died from the lesions produced, or whether climatic conditions or some other unknown factor influenced, is only to be conjectured. The lesions found in the organs were typically those of hemorrhagic septicemia.

In fifteen days after No. 8 had recovered she was bled from the jugular and the remaining horses on the farm were given 100 mil. intravenously. Whether or not the disease had run its course cannot be determined, but no other animals became sick after the treatment.

SUMMARY.

The disease was not caused by the feed, since all sorts of changes were made in feeding corn, oats, clover hay, straw and corn stover, as well as corn fodder. There was not any one combination of feeds that any two animals had after the first two died.

An analysis of the water showed it to be typical of Iowa waters. All animals drank water drawn from the same well, but from different containers.

All animals given medicinal treatment alone died, while all those given either the laboratory serum or the serum from the recovered colt lived, with one exception.

The lesions of the heart may practically be considered pathognomonic.

Dr. Sam Heath has bought the practice of Dr. J. A. Fries at Durand, Michigan.

Captain E. C. Jones has been transferred from Camp Kearny, California, to Fort Oglethorpe, Georgia.

Dr. C. B. Griffiths, formerly of Baileyville, Kansas, is now assistant in the Veterinary Department at the Kansas State Veterinary College.

ABSTRACTS.

POLYNEURITIS OF FOWLS.

(Contribucion al estudio de la polineuritis de las gallinas.)
C. Sanz Egana. *Revista Vet. Espana.*
Vol. XII, No. 6, June, 1918, pp. 241-247.

The author has encountered in Malaga a polyneuritis in fowls which he regards as due to "deficiency" or avitaminosis. The flock in which the disease appeared was kept exclusively for the purpose of consuming injurious insects, and had to live almost entirely on what food the ground provided. Occasionally a feed of seeds of sweet sorghum was furnished to them in special circumstances, but this was seldom.

The disease presented itself generally in a chronic form, and the first symptoms which indicated illness were pains in the legs and difficulty in walking. The gait was vacillating, with incoordination of movements. Little by little the paresis increased, the feathers were held erect, and the wings became involved and pendulous. Paralysis of the neck was accompanied by rigidity and contractures simulating those of tetanus, and there were manifestations reminiscent of those exhibited by a pigeon from which the cerebellum has been removed. Dysphagia accompanied paralysis of the neck. Respiratory symptoms (acceleration, dyspnœa) and general emaciation were very marked. General sensibility diminished greatly. In most instances the disease lasted from fifteen to forty days, but there were more acute cases in which death ensued in from five to eight days.—*Vet. Rev.*

FRACTURE OF THE NAVICULAR BONE.

Bérrar, in the *Deutsch Tierärztlich Wochenschrift* for 1913, discusses this subject. Fractures of the navicular bone are usually effected in the transverse direction and situated in the neighborhood of the medial crest. There are predisposing causes, such as prolonged rest, neurectomy, etc., while the exciting causes are concussions or traumatisms. The certain diagnosis can only be established by means of the Röntgen rays, for acute navicular disease and arthritis of the foot present the same symptoms as fracture of the navicular bone. Prognosis is always unfavorable,

and the lameness persists even in cases where the fracture is consolidated by a callus.

In twenty-five horses destroyed on account of incurable affections of the organs situated in the interior of the hoof, Bérrar found, upon postmortem examination, four fractures of the navicular bone.

The author advances interesting considerations concerning the genesis of these fractures, basing his arguments upon the function of the bone. The bone is compressed between the second phalanx and the perforans tendon; and all its interior structure is organized to support pressure. This structure resembles a collection of tubes or columns disposed perpendicularly to the two surfaces of pressure. The navicular bone is fixed at its two extremities by a rather complex ligamentous apparatus, and supported by the perforans tendon. Fractures supervene from excessive pressure transmitted by the second phalanx; and the perforans tendon, *which is relaxed in certain positions of the limb,* may not counteract such pressure sufficiently.—*Annales de Médecine Vétérinaire.*

DETOXICATED VACCINES.

THOMSON (D). *The Lancet* (London), March, 1919, p. 374.

Thomson has conducted extensive researches on the removal of the endotoxins from the gonococcus and other organisms in order to produce non-toxic vaccines which could be injected in sufficiently large doses to develop a great amount of immunity. The toxicity of most germs was successfully reduced some fifty to one hundred times. Thus, with ordinary gonococcal vaccine it was found necessary to begin in acute cases with doses not exceeding 5,000,000, and gradually to increase to about a maximum of 250,000,000. On the other hand, the same strains of gonococci, when detoxicated, could be administered in acute cases in doses of 2,500,000,000 and increased to 10,000,000,000. These large doses caused even less toxic symptoms than the small doses of the ordinary vaccine.

The therapeutic results obtained corresponded very markedly with the serologic tests. Thus it was found that the cases which showed the highest degree of immunity, as estimated by the complement-fixation test, recovered much more rapidly, and vice versa in those which showed a low degree of complement fixation, the disease ran a prolonged course.

The dose of 200,000,000 of ordinary gonococcal vaccine produced malaise and fever in the normal subject, whereas the symptoms arising from a dose of 5,000,000,000 of the detoxicated vaccine were scarcely noticeable, and no fever was induced. Experiments have been carried out with detoxicated vaccines for the prevention and treatment of bronchial and nasal catarrh, and the results so far have been very promising. Thomson says that the clinical evidence is increasingly convincing that this detoxication process will revolutionize the whole subject of vaccine treatment and preventive inoculations.

THROMBOSIS OF THE AORTA IN A MARE.

(Note sur un cas de thrombose de l'aorte postérieure chez une jument.)
QUENTIN. *Rec. Méd. Vét.*, Vol. XCIV, Nos. 15-17, 15th August-15th September, 1918, pp. 414-415.

A thirteen-year-old mare, on returning to the stable after being shod, suddenly became lame with extension and rigidity of the hind limb. A few yards farther on, the animal fell suddenly. The expression was anxious, the eye staring, the nostrils contracted, the respiration accelerated, the conjunctiva a dark red, and the facial artery obviously distended. The trunk, shoulders, neck and face were hot and burning and covered with an abundant hot sweat. The hind limbs and the croup, on the contrary, were cold and dry. There were violent expulsive efforts, with protrusion of the clitoris and vaginal retropulsion. The animal groaned and even cried out.

The most important postmortem discovery, explanatory of the symptoms, was a dilation of the terminal part of the aorta, containing a thrombus which weighed 250 grammes. This was yellowish, composed of concentric layers, with a rounded anterior end, and prolongations from its posterior extremity into the external iliac and hypogastric arteries. In addition, the following lesions were found: A cyst of the right ovary as large as a turkey's egg; diffuse subacute nephritis (the right kidney weighed 830 grammes, and the left 1,200 grammes); and a certain degree of cardiac hypertrophy, more particularly of the left ventricle.—*Vet. Rev.*

Dr. John M. Hanrahan has recently returned from army service and has accepted a position with the state of Montana, with headquarters at Bozeman.

THE INTRADERMAL PALPEBRAL MALLEIN TEST.

(Observations relatives a l'intra-dermo-malléination palpébrale comme méthod de diagnostic de la morve.)

A. LOUIS and D. LECOMPTE. *Rev. Gén. Méd. Vét.*, Vol. XXVII, No. 320, August, 1918, pp. 361-368.

In discussing the diagnostic value of the intradermal palpebral mallein test, Drouin and Naudinat (Rev. Gén. Méd. Vét., 1914) drew attention to the possibility that œdema may be confined to the lower eyelid, with hardly any inflammation of the conjunctiva, and a limpid (not muco-purulent) discharge. They contended that such reactions should cause the horse to be considered as "suspect," and that, by way of control, the subcutaneous test should be applied. A ministerial circular, dated December 23, 1914, authorized the employment of the intradermal palpebral method of diagnosis, and indicated that an inconclusive reaction should be followed by the subcutaneous test.

In the present communication, Louis and Lecompte give particulars of a number of cases in which the palpebral test has given a doubtful or incomplete reaction in animals shown to be suffering from glanders by other methods of diagnosis. In one case the intrapalpebral injection of mallein never gave a clearly positive reaction, though positive evidence of the presence of glanders was afforded by the subcutaneous test, by intraperitoneal injection into male guinea pigs of material derived from closed lesions, and by serological tests. The postmortem examination confirmed the diagnosis.

All their observations, therefore, confirm the contention of Drouin and Naudinat and the instructions contained in the official circular: "Any animal presenting, thirty-six hours after injection, a more or less marked and persistent œdema confined to the lower eyelid, is to be held as 'suspect' until the diagnosis is controlled by the subcutaneous injection of mallein."—*Vet. Rev.*

After having served as meat inspector while in the army, Dr. H. T. Ludwig has accepted a position with the B. A. I., under Dr. J. S. Grove, at Oklahoma City, Oklahoma.

Dr. M. W. Meidigh has returned from Camp Meade, Maryland, to State College, Pennsylvania.

Lieutenant George A. Handley has been transferred from the Chicago post to Fort Meyer, Virginia.

ARMY VETERINARY SERVICE.

FROM THE OFFICE OF THE SURGEON GENERAL OF THE ARMY, WASHINGTON, D. C.

The following orders of transfer and reassignment of veterinary officers have been issued during the past month:

1. Major John R. Scully, V. C., is relieved from duty as The Veterinarian, A. R. D. No. 327, Ft. Sill, Oklahoma, upon the arrival of Captain James R. Mahaffy, V. C.

1. Captain Forest R. Harsh, V. C., from duty as Camp Veterinarian, Camp Wheeler, Ga., to Camp Shelby, Miss., for duty as Camp Veterinarian.

2. Captain John P. Divine, V. C., from Camp Dix, N. J., to Camp Mills, N. Y., for duty as the Camp Veterinarian.

3. Captain Harry R. Holmes, V. C., from Camp Sevier, S. C., to Camp Upton, N. Y., for duty as The Veterinarian.

4. Captain James R. Mahaffy, V. C., from duty as Zone Veterinarian, Eastern Purchasing Zone, Washington, D. C., to A. R. D. No. 327, Ft. Sill, Okla., for duty as The Veterinarian.

5. Captain Eugene J. Cramer, V. C., from Camp Wadsworth, S. C., to A. R. D. No. 320, Camp Custer, Mich., for duty as The Veterinarian.

1. 1st Lt. George S. Place, V. C., from A. R. D. No. 319, Camp Zachary Taylor, Ky., to Animal Embarkation Depot No. 301, Newport News, Va., for duty as The Veterinarian.

2. 1st Lt. Roy J. Hock, V. C., from A. R. D. No. 318, Camp Sherman, Ohio, to Philippine Department for duty.

3. 1st Lt. Herbert K. Moore, V. C., from Camp Wheeler, Ga., to Camp Lee, Va., for duty as Assistant to the Camp Veterinarian and Meat Inspector.

4. 1st Lt. Charles E. Richardson, V. C., from A. R. D. No. 306, Camp Greene, N. C., to A. R. D. No. 309, Camp McClellan, Ala., for duty.

5. 1st Lt. Francis DeSales Houston, V. C., from A. R. D. No. 314, Camp Beauregard, La., to A. R. D. No. 309, Camp McClellan, Ala, for duty.

6. 1st Lt. Roy R. Washer, V. C., from Camp Lee, Va., to Camp Knox, Ky., as Assistant to Camp Veterinarian and Meat Inspector.

7. 1st Lt. Frank C. Meisner, V. C., from Camp Knox, Ky., to Ft. McPherson, Ga., for duty as Post Veterinarian and Meat Inspector.

8. 1st Lt. Ralph B. Stewart, V. C., from Camp Jackson, S. C., to Ft. Leavenworth, Kans., for duty as Post Veterinarian and Meat Inspector.

9. 1st Lt. Wm. D. Faison, V. C., from duty as Veterinarian, 5th Cav., Ft. Bliss, Tex., to San Francisco, Calif., for duty as Transport Veterinarian on the U. S. Transport "Dix."

10. 1st Lt. Homer Johnson, V. C., from Camp Hancock, Ga., to Camp Custer, Mich., for duty as Assistant to the Camp Veterinarian and Meat Inspector.

11. 1st Lt. Robert S. Beattie, V. C., from A. R. D. No. 302, Charleston, S. C., to Ft. Bliss, Tex., for duty as Veterinarian with the 5th Cav. at that Post.

12. 1st Lt. Wm. R. Wolfe, V. C., from A. R. D. No. 329, Camp Travis, Tex., to A. R. D. No. 317, Camp Pike, Ark., for duty.

13. 1st Lt. Geo. A. Handley, V. C., from duty with the Zone Supply Officer, Chicago, Ill., to Ft. Myer, Va., for duty as Post Veterinarian.

14. 1st Lt. Edward M. Lynn, V. C., from duty with the Zone Supply Officer, Chicago, Ill., to Camp Pike, Ark., as Assistant to the Camp Veterinarian.

15. 1st Lt. Albert McGreevy, V. C., from duty with the Zone Supply Officer, Chicago, Ill., to Camp Travis, Tex., for duty as Assistant to the Camp Veterinarian.

16. 1st Lt. Ralph M. Ward, from duty from the Zone Supply Officer, Chicago, Ill., to Ft. Bliss, Tex., for duty as Assistant to the Camp Veterinarian.

1. 2nd Lt. Edward M. Jucknicss, from A. R. D. No. 319, Camp Taylor, Ky., to Philippine Islands for duty.

2. 2nd Lt. Geo. W. Rawson, from A. R. D. No. 307, Camp Wadsworth, S. C., to A. R. D No. 311, Camp Wheeler, Ga., for duty.

3. 2nd Lt. Frank O. Brostrom, from A. R. D. No. 318, Camp Sherman, Ohio, to Philippine Department for duty.

4. 2nd Lt. Chauncy E. Moorman, from A. R. D. No. 313, Camp Shelby, Miss., to Ft. Sam Houston, Tex., for duty with the 14th Cav.

5. 2nd Lt. Harry I. Stanton, A. R. D. No. 314, Camp Beauregard, La.. to A. R. D. No. 309, Camp McClellan, Ala., for duty.

6. 2nd Lt. Herbert M. Armstrong, at A. R. D. No. 318, Camp Sherman, Ohio, is, in addition to his other duties, assigned to duty with Field Remount Squadron No. 350, that Camp.

7. 2nd Lt. Ward C. Timblin, from F. R. S. No. 350, Camp Sherman, Ohio, to A. R. D. No. 318, Camp Sherman, Ohio, for duty.

8. 2nd Lt. Harry E. Mitchell, from A. R. D. No. 329, Camp Travis, Tex., to A. R. D. No. 317, Camp Pike, Ark., for duty.

9. 2nd Lt. James E. Masterson, from Camp Jackson, S. C., to Ft. Leavenworth, Kans., for duty as Veterinarian at the U. S. Disciplinary Barracks of that Post.

10. 2nd Lt. Frank R. Osborn, from A. R. D. No. 329, Camp Travis, Tex., to A. R. D. No. 317, Camp Pike, Ark.

11. 2nd Lt. Anthony J. Matter, from A. R. D. No. 326, Camp Cody, N. M., to Ft. Wingate, N. M., for duty as Post Veterinarian.

12. 2nd Lt. W. W. Utzmann, from A. R. D. No. 326, Camp Cody, N. M., to Ft. Ringgold, Tex., for duty with the 4th Cav.

13. 2nd Lt. Oscar W. Anderson, from duty with the Zone Supply Officer, Chicago, Ill., to Camp Sherman, Ohio, for duty as Assistant to the Camp Veterinarian.

14. 2nd Lt. Joseph T. Mahoney, from duty with the Zone Supply Officer, Chicago, Ill., to Camp Bowie, Tex., for duty as Assistant to the Camp Veterinarian.

15. 2nd Lt. Lester W. Thiele, from duty with the Zone Supply Officer, Chicago, Ill., to Camp Kearny, for duty as Assistant to the Camp Veterinarian.

16. 2nd Lt. Paul S. Christman, from Camp Wadsworth, S. C., to A. R. D. No. 307, Camp Wadsworth, S. C., for duty.

The following officers have been promoted to the grade of Captain for the period of the emergency to date from November 13, 1918. These officers are on duty with the American Expeditionary Forces, France:

1. 1st Lt. H. B. Balthazer.
2. 1st. Lt. I. L. Barstow.
3. 1st Lt. H. L. Blackburn.
4. 1st Lt. E. I. Cheely.
5. 1st Lt. Harold Clarke.
6. 1st Lt. W. M. Decker.
7. 1st Lt. G. L. Fallon.
8. 1st Lt. J. J. Essex.
9. 1st Lt. P. T. Gillie.
10. 1st Lt. G. W. Grim.
11. 1st Lt. H. H. Haigh.
12. 1st Lt. F. E. Jones.
13. 1st Lt. W. C. Keck.
14. 1st Lt. R. E. Kyner.
15. 1st Lt. C. J. McAnulty.
16. 1st Lt. R. B. McCord.
17. 1st Lt. H. C. McKim.
18. 1st Lt. N. S. Nutty.
19. 1st Lt. J. P. Porch.
20. 1st Lt. T. J. Quinn.
21. 1st Lt. G. T. Reaugh.
22. 1st Lt. D. S. Robertson.
23. 1st Lt. H. B. Roshon.
24. 1st Lt. R. W. Smith.
25. 1st Lt. Edwin Temple.
26. 1st Lt. J. R. Underwood.
27. 1st Lt. H. C. Vestal.
28. 1st Lt. A. C. Wight.
29. 1st Lt. F. F. Younglove.
30. 1st Lt. G. M. Zinkham.
31. 1st Lt. C. W. Likely.

The following officers have been promoted to the grade of Captain for the period of the emergency to date from February 17, 1919. These officers are on duty with the American Expeditionary Forces, France:

1. 1st Lt. C. R. Boshart.
2. 1st Lt. C. R. Farmer.
3. 1st Lt. C. L. Miller.
4. 1st Lt. W. C. Nickel.
5. 1st Lt. J. N. Shaw.
6. 1st Lt. O. J. Conzelman.
7. 1st Lt. P. H. Burnett.
8. 2nd Lt. C. S. Stirrett.

The following 2nd Lieutenants, V. R. C., were promoted to the grade of 1st Lieutenant, V. C., U. S. A., to rank from No-

vember 13, 1918. These officers are on duty with the American Expeditionary Forces, France:

1. 2nd Lt. B. C. Bridges.
2. 2nd Lt. L. J. Brown.
3. 2nd Lt. J. E. Butin.
4. 2nd Lt. M. L. Claflin.
5. 2nd Lt. A. W. Combs.
6. 2nd Lt. B. H. Dunkley.
7. 2nd Lt. M. C. Fritzwater.
8. 2nd Lt. C. T. Guilfoyle.
9. 2nd Lt. E. M. Hough.
10. 2nd Lt. W. M. McLeod.
11. 2nd Lt. O. O. Long.
12. 2nd Lt. L. A. Marshall.
13. 2nd Lt. C. S. Parker.
14. 2nd Lt. J. F. Rogers.
15. 2nd Lt. H. M. Savage.
16. 2nd Lt. Thomas Shields.
17. 2nd Lt. L. R. Smith.
18. 2nd Lt. J. T. Traylor.
19. 2nd Lt. W. L. Williamson.
20. 2nd Lt. E. W. Youngblood.

The following Captains have been honorably discharged from the Veterinary Corps, United States Army:

1. Captain C. R. Sandberg, who was on duty as The Veterinarian, A. R. D. No. 322, Camp Dodge, Iowa.
2. Captain A. H. F. Harmening, who was on meat inspection duty with the Zone Supply Officer, Chicago, Ill.
3. Captain Norris L. Townsend, who was on meat inspection duty with the Zone Supply Officer, Chicago, Ill.
4. Captain Thomas T. Rundle, who was on duty at the Veterinary Hospital, Camp Lee, Va.
5. Captain J. L. Wright, who was on duty as Camp Veterinarian, Camp Greene, N. C.
6. Captain P. H. Wallingford, who was on duty as Camp Veterinarian, Camp Humphreys, Va.
7. Captain Basil Bennett, who was on duty as The Veterinarian, A. R. D. No. 325, Camp Logan, Tex.
8. Captain Robert Graham, who was on duty as The Veterinarian at the Medical Department Laboratory, Ft. McPherson, Ga.
9. Captain Homer V. McCullah, who was on duty as the Camp Veterinarian, Camp Fremont, Calif.
10. Captain C. H. Carnahan, who was on duty as The Veterinarian, 13th Division, Camp Lewis, Wash.
11. Captain R. M. Hofferd, who has been on duty with the 92nd Division, A. E. F., returned to this country with that division and was discharged at Camp Upton, Long Island.
12. Captain R. A. Moye, who was on duty as Camp Veterinarian, Camp Sherman, Ohio.
13. Captain R. Porteuse, who was on duty as Camp Veterinarian, Camp Gordon, Ga.
14. Captain D. M. Hoyt, who was on duty as Camp Veterinarian, Camp Shelby, Miss.
15. Captain R. D. Chew, who was on duty as Camp Veterinarian, Camp Beauregard, La.

2nd Lieut. R. L. Conklin, V. C., Regular Army, resigned March 12, 1919.

Major A. R. Kincaid, U. S. A., who was on duty as the Division Veterinarian, 17th Division, Camp Beauregard, La., has been honorably discharged.

The following 1st Lieutenants have been discharged from the Veterinary Corps during the past month:

1. 1st Lt. G. M. Smith.
2. 1st Lt. Rosser Lane.
3. 1st Lt. John Doerr.
4. 1st Lt. Edgar E. Williams.
5. 1st Lt. F. R. McNabb.
6. 1st Lt. G. W. Lies.
7. 1st Lt. Arnold J. Thompson.
8. 1st Lt. J. B. Barnes.
9. 1st Lt. E. J. Laing.
10. 1st Lt. W. F. Dixon.
11. 1st Lt. A. D. Kendrick.
12. 1st Lt. J. D. Corson.
13. 1st Lt. C. T. Dooley.
14. 1st Lt. G. J. Kigler.
15. 1st Lt. F. W. Heuben.
16. 1st Lt. C. P. Lamb.
17. 1st Lt. B. B. Flowe.
18. 1st Lt. R. D. Miller.
19. 1st Lt. R. D. Lorton.
20. 1st Lt. M. H. Hilman.
21. 1st Lt. S. M. Langford.
22. 1st Lt. O. C. Kackley.
23. 1st Lt. J. E. Syferd.
24. 1st Lt. F. W. Bratten.
25. 1st Lt. G. W. Hamilton.
26. 1st Lt. R. M. Thomas.
27. 1st Lt. E. S. Markham.
28. 1st Lt. M. L. Claflin.
29. 1st Lt. A. M. Combs.

The following 2nd Lieutenants have been discharged from the Veterinary Corps during the past month:

1. 2nd Lt. L. R. Montgomery.
2. 2nd Lt. R. F. Gard.
3. 2nd Lt. Julian Lyon.
4. 2nd Lt. E. L. Foos.
5. 2nd Lt. W. C. Bateman.
6. 2nd Lt. A. Sanders, Jr.
7. 2nd Lt. W. H. Roeschlein.
8. 2nd Lt. D. K. Williams.
9. 2nd Lt. Wm. G. Warren.
10. 2nd Lt. E. C. Hicks.
11. 2nd Lt. H. A. Milo.
12. 2nd Lt. G. B. Shinn.
13. 2nd Lt. O. H. Trout.
14. 2nd Lt. L. H. Mathers.
15. 2nd Lt. J. R. Wiley.
16. 2nd Lt. F. P. Murphy.
17. 2nd Lt. Wm. M. Long.
18. 2nd Lt. R. E. Duckworth.
19. 2nd Lt. Irving Moles.
20. 2nd Lt. M. W. Neidigh.
21. 2nd Lt. F. F. Buck.
22. 2nd Lt. P. H. Egan.
23. 2nd Lt. C. McH. Greer.
24. 2nd Lt. C. J. Simmons.
25. 2nd Lt. Cecil Elder.
26. 2nd Lt. R. W. Broadhurst.
27. 2nd Lt. C. M. Lutz.
28. 2nd Lt. O. A. Cook.
29. 2nd Lt. L. J. Hinson.
30. 2nd Lt. M. P. Fuller.
31. 2nd Lt. J. F. Lineberger.
32. 2nd Lt. I. H. Arnold.
33. 2nd Lt. M. A. Quinn.
34. 2nd Lt. Wm. T. Pittinger.
35. 2nd Lt. Henry G. Smith.
36. 2nd Lt. F. L. Cissell.
37. 2nd Lt. E. P. Anderson.
38. 2nd Lt. C. E. Blosdale.
39. 2nd Lt. P. L. Matthews.
40. 2nd Lt. V. A. Holby.
41. 2nd Lt. F. S. Klein.
42. 2nd Lt. C. E. Wicktor.
43. 2nd Lt. R. G. Menefee.
44. 2nd Lt. S. A. Schneidman.
45. 2nd Lt. W. M. Henry.
46. 2nd Lt. Michael Shiply.
47. 2nd Lt. J. O. Ashley.
48. 2nd Lt. A. J. Allott.
49. 2nd Lt. D. L. Cecil.
50. 2nd Lt. H. A. Chapin.

51. 2nd Lt. George Wessels.
52. 2nd Lt. W. B. Hirleman.
53. 2nd Lt. C. B. Emerick.
54. 2nd Lt. S. D. Cronk.
55. 2nd Lt. H. F. Dailey.
56. 2nd Lt. T. S. Williams.
57. 2nd Lt. F. W. Beck.
58. 2nd Lt. S. R. Poulter.
59. 2nd Lt. J. C. Mitten.
60. 2nd Lt. F. F. Dowd.
61. 2nd Lt. E. J. Yocom.
62. 2nd Lt. M. L. Plumer.
63. 2nd Lt. H. E. Van Der Veen
64. 2nd Lt. E. B. Oliver.
65. 2nd Lt. D. D. Dragoo.
66. 2nd Lt. J. J. Glover.
67. 2nd Lt. L. P. Sharp.
68. 2nd Lt. F. J. Trafton.
69. 2nd Lt. W. T. Vilott.
70. 2nd Lt. M. L. Hutchins.
71. 2nd Lt. E. E. Brosnan.
72. 2nd Lt. O. N. Schultz.

Lieutenant Colonel Gerald E. Griffin, U. S. A., has been relieved from duty at Ft. Myer, Va., and directed to proceed to Atlanta, Ga., and take station at that place. He will act as General Veterinary Inspector in the following territory: Tennessee, New Orleans, Louisiana, Mississippi, Alabama, Georgia, Florida, North Carolina and South Carolina. Major R. M. Staley, U.S.A., now General Veterinary Inspector for that territory, will be relieved from duty on the arrival of Lieutenant Colonel Griffin and will proceed to Washington, D. C., and report to the Surgeon General for duty. Major Staley contemplates an early return to civil life.

The duties of the General Veterinary Inspector for this district may be briefly summarized as follows:

(a) To coöperate with the Bureau of Animal Industry in the disinfection of public stables, yards and stock lines used in the transportation and collection of animals for or in the military service.

(b) Inspecting and reporting upon: The sanitary condition of yards, depots, veterinary hospitals, horse lines and stables, etc., in his territory belonging to or used by the War Department and not under the control of the Department Commander, the methods used in handling animals therein, the efficiency of veterinary officers and upon such other offices that have a direct bearing on the Veterinary Service or on the prevention of disease and inefficiency of animals.

VETERINARY ENLISTED PERSONNEL, MEDICAL DEPARTMENT.

The General Staff have recognized that the Veterinary Corps, Regular Army, must have an enlisted personnel.

The reorganization plans for the Regular Army call for an enlisted Veterinary Corps personnel in the Medical Department. To determine the number of men necessary a ratio of forty enlisted men for each thousand authorized public animals has been used as a basis. The grades for this personnel will be similar to those now in the Medical Department, so that the Veterinary Corps men will have the same opportunities for advancement as men of other branches of the service.

Authority for the enlistment of men for the Veterinary Corps, Regular Army, was published in the following circular:

War Department,
Circular No. 141. Washington, March 24, 1919.

INSTRUCTIONS GOVERNING VOLUNTARY ENLISTMENT, AMENDMENT TO CIRCULAR NO. 113, WAR DEPARTMENT, 1919.

Paragraph 5, Circular No. 113, War Department, 1919, is rescinded and the following is substituted therefor:

5. Enlistment of men for certain special services. Extract:

Men who desire to enlist or reënlist in the Veterinary Corps or Dental Corps will be enlisted for the Medical Department and will be transferred immediately to the Veterinary Corps or Dental Corps, respectively, for assignment in accordance with the provisions of Circular No. 101, War Department, 1919.

(342, A. G. O.)

By order of the Secretary of War:

Frank McIntyre,
Major General, Acting Chief of Staff.

FIRST ENLISTMENT, VETERINARY CORPS, REGULARY ARMY.

On March 26, 1919, two days after the authority for enlistments was published, Gabriel A. Wright enlisted at Camp Sherman, Ohio.

All Veterinary Detachment Commanders were immediately notified of this provision for an enlisted Veterinary Corps personnel in the Regular Army. It is hoped that the Corps will be able to obtain a considerable number of men by voluntary enlistment. All enlistments are for the grade of private, but provision is made for promotion of those capable of performing the duties required of the grades. There are two enlistment periods authorized at present. For those who have had previous service they may enlist for either one or three years, while men without previous service will have to enlist for three years. Besides service in the United States, men will be required for duty with the American Expeditionary Forces, France, in Panama, Hawaii, Philippine Islands and China. An unusual opportunity is hereby offered for travel in foreign lands. It will probably be necessary for men who desire overseas service to enlist for three years. Men qualified as clerks, typists, stenographers, pharmacists, cooks, horseshoers, teamsters and stablemen will be needed.

Besides the opportunity for travel this service will offer training to men in horseshoeing, veterinary first aid, care and handling of animals, feeds and feeding, inspection of meat and milk products and horsemastership.

A VETERINARY ARTIST.

A real artist has been discovered in the person of 2nd Lieut. Horst Schreck, V. C., U. S. A. Lieut. Schreck has been on duty at Auxiliary Remount Depot No. 303, Camp Dix, New Jersey. While there he made some excellent paintings and pen and ink drawings of pathological conditions. His work has been pronounced as exceptionally accurate and realistic. Lieut. Schreck is now on duty at the Auxiliary Remount Depot, Camp Hancock, Georgia, and is devoting his time to the making of paintings and drawings of cases of dermatitis gangrenosa in the various stages of the disease. An accurate clinical history will be kept to accompany the drawings. It is expected that the Veterinary Corps will be able to obtain some very valuable data in regard to this disease, which has been prevalent in some of the Remount Depots, and will be able to present to the veterinary profession original work along this line which will be of great scientific value.

OFFICERS, VETERINARY CORPS, UNITED STATES ARMY.

	On Duty November 11, 1918.	On Duty April 11, 1919.
Colonels	1	0
Lieutenant Colonels	3	2
Majors	78	78
Captains	205	182
First Lieutenants	681	487
Second Lieutenants	1,216	555
	2,184	1,304

RANK, PAY AND ALLOWANCES FOR VETERINARIANS.

On August 20, 1918, the Comptroller approved the Auditor's decision that there was no authority for the appointment or promotion of a veterinarian now in the Army as defined by par. 4, Sec. 16, National Defense Act, June 3, 1916, to the grade of Major, Veterinary Corps.

On October 9, 1918, the Comptroller ruled that the Selective Service Act of May 18, 1917, did not authorize the appointment in the temporary forces raised thereunder of colonels, lieutenant colonels and majors in the Veterinary Corps.

On December 6, 1918, the Auditor ruled that there was no authority for the promotion of veterinary officers except as provided in Sec. 16, National Defense Act, June 3, 1916, which requires five years' service to a first lieutenancy, etc.

From the time the first opinion was received at the Surgeon General's office until a final decision was rendered by the Comptroller, the Director of the Veterinary Corps has been untiring in his efforts to have these opinions reversed and consequently

secure for the officers of the Veterinary Corps their just status. It is a source of great satisfaction to be able to report the success of these efforts.

On April 9, 1919, the Comptroller rendered a decision which reverses the ones above referred to. The grade of Major in the Veterinary Corps, Regular Army, under the National Defense Act of June 3, 1916, for veterinarians now in the Army after twenty years' service is held to be authorized. Payments made or to be made to men commissioned in the Veterinary Corps as colonels, lieutenant colonels, majors, captains, first lieutenants and second lieutenants will not be disturbed by the accounting officers if correctly made in other respects.

It is expected that prompt action will be taken by the War Department to restore the grade of major for the Veterinary Corps in the Regular Army.

Major Albert N. Towner of the Army Veterinary Corps with the A. E. F. is now Area Veterinarian of the American embarkation center.

Major H. F. Steele of the regular army veterinary service and who for more than a year has been in the war zone in France has recently returned to this country and sent to the White Plains, New York, Sanitorium to recover from an attack of laryngitis that made him voiceless for many weeks. While in New York City he visited his Alma Mater.

Captain O. E. McKim of New York, who, after an unusual experience as veterinarian to the allied horse shipping service, entered the U. S. Army Veterinary Corps in France, has just recovered from an attack of lobar pneumonia in Germany following the armistice. At all times in the war zone he daily reported for duty in the service until after November 11, 1918. Captain McKim lectured on army veterinary service at the New York State Veterinary College in New York City before going abroad.

Major E. B. Ackerman of Brooklyn, recently located at Camp McClellan, Alabama, after very successful work at Camp Greene, North Carolina, has been released from the service and will resume practice in the metropolitan district.

Captain R. A. Mullings, formerly stationed at Jersey City, in charge of that division of the B. A. I., and who entered the Army Veterinary Service and was placed in charge of army meat inspection in the eastern division, will shortly leave the Army Veterinary Service to accept a position of larger service with one of the "big five."

POLO TEAM OF VETERINARY TRAINING SCHOOL, CAMP LEE, VA.
Believed to Be the First Polo Team Ever Organized in the United States Composed Entirely of Veterinarians.

From left to right: Lieut Col. Griffin, instructor; Captain Smith, captain of the team; Captain Haring, Captain Hardenbergh, Captain Mackie.

ASSOCIATION NEWS.

AMERICAN VETERINARY MEDICAL ASSOCIATION.

NEW ORLEANS AND THE A. V. M. A.

In only a few months after this page sees the light thousands of veterinarians will be hurrying from their homes to various ticket offices to inquire about accommodations from "Somewhere in America" to New Orleans, Louisiana. It will be simple for the railroad agent to advise you, because so many of the great arteries of transportation lead direct to the "Winter Capital of America."

GRUNEWALD HOTEL, NEW ORLEANS.
Headquarters 56th Annual Meeting A. V. M. A.

The nearest the A. V. M. A. has ever come to the southern section was twenty-two years ago, when it visited Nashville, Tennessee. Since that time many changes have been made on the map and hundreds of students have chosen to enter the veterinary profession, all of which has brought "Dixie Land" into keen competition with other sections of the country.

The Crescent City is looking for you and when you arrive outstretched arms will welcome you into the gates of a different

atmosphere of social life, so saturated with a blend of southern hospitality and French manners, the memory of which will linger with you long after the convention has been forgotten. Historically, New Orleans is the most interesting city in America, with the Creole quarter of French and Spanish romance and the American quarter, a great modern metropolitan center throbbing with business, its massive steel and stone structures reaching upwards toward the sky line.

If you are yearning for a journey abroad and cannot make your desires mature, just consider and supplement it with a trip this fall to the A. V. M. A. from November 17 to 21, inclusive, and the famous restaurants of the city will maintain their splendid reputations, offering with pride to their guests the same French, Italian, Latin-American and other high-class cuisine that each nation daily serves to its countrymen.

The fifty-sixth annual meeting will be held on the twelfth floor in the auditorium of the Grunewald Hotel. The hall is large, light and twelve stories from the street, so the traffic will not disturb the execution of the program. On a separate page will be seen a picture of headquarters which should not fail to attract the most fastidious. Other magnificent hotels are the St. Charles, Monteleone, DeSoto, Lafayette, Cosmopolitan, Planters', and the Inn. Commercial houses desiring space for exhibition purposes should communicate early with the management of the Grunewald for reservation and prices, and signify a willingness to use the same space for sleeping quarters, with the understanding that assignment be made accordingly, on the twelfth floor, convenient and accessible to all in attendance.

From all appearances, this will be one of the largest and most important meetings ever held; notably because it is scheduled for New Orleans, which never fails to command attention when on the itinerary of the average tourist. Therefore, those anticipating the trip should plan for reservation months in advance, for choked European traffic has turned loose a mass of sightseeing Americans to discover new things at home, and many of them will be departing from a colder climate to various southern points, particularly New Orleans, because of the early approach of the racing season.

The time of year selected is the most beautiful and delightful of all. The hot summertime will be gone and the air will be tempered with the cool breezes from the great gulf, which is only about one hundred miles distant, where the Father of Waters

empties its volume into the sea. Come to the meeting—bring new members and persuade your friends to accompany you. Bring cool suits for warm, pleasant days and a medium-weight for evenings and sudden changes. Like all semi-tropical areas, frequent changes in the weather may be expected. However, there need be no particular inconvenience if one only uses a little judgment and comes accordingly.

The ladies, as usual, are extended a cordial invitation to attend and we, in Louisiana, strongly insist that they make this occasion one of their most important social functions of the season. The committee will provide pleasing and cheerful entertainments, full of splendor and action, certain to meet with the approval of the most discriminating. A convention without the ladies would be lacking in character, culture and refinement, all of which go to broaden our vision and promote a spirit of kindly feeling toward all. Doctors, bring your wives and daughters! And wives and daughters, prepare now for one of the best times in all your lives.

The Louisiana Veterinary Medical Association through its officers is doing everything possible to make the occasion a complete success, to the end that we hope no one will leave disappointed, but, on the other hand, wish to linger a little longer, and as the train slowly departs, firmly resolve to hurry back to the land of the golden sunset.—E. I. SMITH, Secretary-Treasurer and Chairman Arrangements, Louisiana Veterinary Medical Association.

TO APPOINT DELEGATES TO NEW ORLEANS.

Responding to invitations from President Moore of the American Veterinary Medical Association and Dr. E. P. Flower, president of the Louisiana Veterinary Medical Association, the Louisiana State Medical Society, recently in annual session at Shreveport, Louisiana, unanimously passed a resolution providing for the appointment of one delegate and one alternate from each congressional district of the state to attend the annual meeting, in New Orleans, of the American Veterinary Medical Association.

Captain J. A. McKinnon, formerly located at Manila, Philippine Islands, is now in Siberia. He has been appointed Chief Veterinarian of the American Expeditionary Forces.

Captain O. C. Selby has returned from Camp Meade, Maryland, to his home in Worthington, Minnesota.

OTHER ASSOCIATIONS

LOUISIANA VETERINARY MEDICAL ASSOCIATION.

Dr. E. Pegram Flower, president of the Louisiana Veterinary Medical Association, has appointed the following committee of arrangements in connection with the next meeting of the American Veterinary Medical Association to be held in New Orleans from November 17 to November 21, inclusive:

Dr. E. I. Smith, chairman, Baton Rouge, La.
Mr. Thomas J. Hill, Association of Commerce, New Orleans.
Dr. W. H. Dalrymple, Baton Rouge, La.
Dr. R. W. Tuck, New Orleans, La.
Dr. E. P. Flower, Baton Rouge, La.
Dr. A. W. Vornheder, New Orleans, La.
Dr. J. Arthur Goodwin, New Iberia, La.
Dr. J. R. Upton, Baton Rouge, La.
Dr. F. J. Cambon, New Orleans, La.

The above committee will do everything possible to make the convention a colossal success and the chairman invites suggestions and will be at the command of the association from now until the end of the session.

E. I. S.,
Secretary-Treasurer.

MAINE VETERINARY MEDICAL ASSOCIATION.

At the January meeting of the Maine Veterinary Medical Association, held at Augusta, Maine, the congratulations of the members were extended to Dr. A. L. Murch of Bangor, Maine, on his recent election to the Legislature.

E. E. Russell, Secretary.

VETERINARY MEDICAL ASSOCIATION OF NEW YORK CITY.

The regular monthly meeting of the Veterinary Medical Association of New York City was held in the lecture room of Carnegie laboratory, 338 East Twenty-sixth Street, Wednesday evening, March 5, at 8:30 o'clock, President Cochran in the chair.

The minutes of the February meeting were read and approved.

Dr. Thomas B. Rogers, Woodbury, New Jersey, gave an instructive address on "A New Pharmacopæia," or a veterinary section in the new U. S. Pharmacopæia, which will be adopted in 1920. Dr. Rogers gave important reasons for the necessity of this veterinary section in the U. S. P. Amongst others, he mentioned the large number of preparations necessary for the larger animals, as, for example, the equine veterinary blister and the aloetic physic ball. The smaller animals also need a number of special preparations other than those listed in the U. S. Pharmacopæia.

The Doctor advocated the more general use of the acetic acid extracts in veterinary practice, stating that in his experience they were just as effective as the alcoholic extracts and also stating that the doses should be slightly larger. He advocated the appointment of a veterinary delegate on the revision committee of the U. S. Pharmacopæia.

Discussion.—Dr. Hoskins said that a committee of the American Veterinary Medical Association had been appointed to take up this work at the Philadelphia meeting. Dr. Ellis mentioned the cloudy appearance the acetic acid extracts gave when mixed with water as one of his objections to them and that he did not think they were quite as active as the alcoholic extracts. Dr. DeVine said he had used the acetic acid nux vomica for a number of years with good results. Dr. Rogers asked the Secretary to read a letter he received from Charles A. LaWall, asking that a veterinarian be appointed on the revision committee of the U. S. P. This letter was referred to Dean Hoskins, who will communicate with the President of the American Veterinary Medical Association.

On the question box being opened the following question was asked, "Are the serums and bacterins of any real value in the prevention and treatment of canine distemper?" This subject furnished material for an interesting discussion entered into by Drs. Ellis, Millar, Crawford, Rogers and DeVine, Dr. Gannett also intervening to report that the Boston terrier bitch from which he removed the ovaries and uterus had made a good recovery. The concensus of opinion was that the sero-bacterins have their value if practitioners know how to use them.

The President then called on Lieutenant McTammany, lately returned from France, to say a few words on his army experiences. The Lieutenant gave the members a genuine treat in relating his sixteen months of army life in France. He said he

had been under fire on four different fronts and that he had met only two persons in France whom he had known before going across, one of them being our old colleague Major C. Clayton. He also gave an amusing account of his experiences getting into and out of the various hospitals in France which was very much enjoyed by all present.

The proposed amendment to the by-laws was taken up for discussion. This amendment, by a majority vote, was tabled.

Dr. W. I. McKinney, chairman of the committee on smoker, said that on account of the high prices of food and entertainment, etc., the tickets to the smoker would cost about $4.00 and that he did not think the committee was warranted to go ahead and make arrangements on that basis. It was regularly moved, seconded and carried that the motion to hold a smoker be reconsidered.

Dr. Ellis, chairman on twenty-fifth anniversary committee, said that as our alumni dinner and reunion would come in June he thought it would be better to postpone the twenty-fifth anniversary of the association celebration until our first meeting in the fall. Dr. Thomas E. Smith moved that we hold a social function to celebrate the twenty-fifth anniversary of the association sometime during the month of October. Seconded and carried.

Dr. McKinney, reporting for the board of censors, recommended that Dr. I. I. Curren be dropped from the roll. It was moved, seconded and carried that the recommendation of the board of censors in this case be adopted and that Dr. I. I. Curren be hereby dropped from the roll of membership in this association.

Dr. Harry Ticehurst, Morsemere, New Jersey, Dr. Isaac Wertheimer, 42 Bushwick Place, Brooklyn, and Dr. George C. Bowen, New Hyde Park, Long Island, were unanimously elected to membership in the association.

Dean Hoskins, chairman of the legislative committee, reported progress in the Carroll bill. Dean Hoskins mentioned the introduction of several new bils in the Legislature of importance to the veterinary profession, among them a bill to extend the tuberculin test so that owners of dairies may employ any veterinarian to test their cattle and make no report to the department of agriculture necessary, and that owners have the right to sell their reacting animals where they choose.

Another bill has been introduced increasing the tax on bitches from $3 to $10 a year. Dean Hoskins spoke at some length on the injustice of this tax on dog owners and of the immense sums the state was collecting from dog taxes, $900,000 in this state in the past two years, without giving anything adequate in return to the sheep industry, for which these taxes were originally intended, to build up the sheep industry.

Drs. Gannett, Smith, Rogers and DeVine also spoke on this proposed legislation.

No further business appearing, the meeting adjourned.

J. E. Crawford, Secretary.

NATIONAL ASSOCIATION OF BUREAU OF ANIMAL INDUSTRY VETERINARIANS.

The semi-annual dues (per capita tax) of all members of this association for the term of six months ending August 31, 1919, are now due at the rate of $1.50 for each member. In this connection I respectfully quote the following extracts from our national constitution as adopted at the Philadelphia convention:

Art. 5, Sec. 2. The representation of any association at the national convention shall be based on the average amount of per capita tax paid by that association during the fiscal year.

Art. 10, Sec. 1. The fiscal year of this body shall begin on September 1 and end on August 31.

Art. 10, Sec. 2. The per capita tax to cover the expenses of this association shall be $3.00 per annum and shall be collected from all active members by the state, divisional and district associations, and by them remitted to the national secretary. Members-at-large shall remit per capita tax direct to the national secretary. This tax may be paid semi-annually.

All drafts, exchanges, postoffice or express money orders should be made payable to Dr. S. J. Walkley, Secretary, 185 Northwestern Avenue, Milwaukee, Wisconsin.

Some of our subordinate associations have previously remitted per capita tax for their entire membership for the year ending August 31, 1919, and other associations have remitted for a portion of their members for that period. This call is issued for the benefit of those members, only, whose per capita tax for the period ending August 31, 1919, remains unpaid.

The Bureau veterinarians deserve much credit for the liberal response made to the appeal for donations of two days' pay and an itemized statement of the contributions will be published later, showing the amount of each contribution. A large majority of those donating have given basic salary plus the temporary bonus and in some cases the donations have been in excess of those salaries.

It is of paramount importance that we have as nearly 100 per cent membership as possible and it should be borne in mind that contributing to the legislative fund does not constitute membership in the association. The per capita tax or membership fund and the legislative fund are separate and distinct.

Zone vice presidents and district organizezrs are urged to continue their efforts for a greater membership so that we may be prepared for some real teamwork in launching an intensive drive on a moment's notice. Our committee on legislation and publicity will keep the membership advised regarding developments in connection with legislation in which our association is interested.

On February 18, 1919, Dr. J. S. Koen of Des Moines, Iowa, resigned as our national president on account of leaving the Bureau service to accept more lucrative employment. Under the provisions of Art. 8, Sec. 2, of our national constitution, the vice president at large thereupon assumed the duties of the president. Hence, all correspondence for the office of our national president should be addressed to Dr. Frank P. St. Clair, Federal Building, South Side Station, Omaha, Nebraska. This leaves the office of vice president at large vacant and the present indications are that it shall remain vacant until the time of our next national convention.

Dr. Frank R. Jones of Fort Worth, Texas, has resigned as a member of our committee on legislation and publicity, on account of leaving the Bureau service to enter a more promising field in the commercial world, and Dr. O. B. Hess, in charge, office of hog cholera control, Washington, D. C., was appointed by former President Koen to fill the resulting vacancy on our committee of legislation and publicity. S. J. Walkley, Secretary.

March 24, 1919.

ASSOCIATION OF STATE AND PROVINCIAL VETERINARY COLLEGES.

REPORTS OF COMMITTEES.

Committee on Methods of Teaching Serum Therapy.

It is the experience of those offering courses in bacteriology and in serum therapy and immunity that the veterinary student is capable of undertaking such courses earlier than students in other fields. This is due to the fact that the supporting subjects in the veterinary curriculum furnish a better basis for laboratory

work in these subjects than do the supporting subjects in other courses. The course in immunity and serum therapy should be preceded by a thorough and complete lecture and laboratory course in general and pathogenic bacteriology, together with the fundamental discussion of theories of immunity. This should be offered not earlier than the sophomore year, and should not be followed immediately by the course in serum therapy and immunity. The latter should be given not earlier than the first semester of the senior year, preferably the last. In the interim the student will have had his courses in pathology, chemistry, physiology and medicine and will be better able to undertake the study of immunity and serum therapy. This subject presents intricate reasoning and phenomena of great complexity and a true insight into it can be obtained only through great labor. With Dr. Zinsser, we believe that it is a poor plan to attempt too extensively to simplify the material or to make an A B C of immunity as a quick road to comprehension. The self-satisfaction which comes to the student who masters the principles of immunity well repays him for the effort required. After mastering these principles, the concepts of the subject are relatively simple. The subject must be treated critically and the data which are accepted as fact must be separated from those upon which there are well-founded differences of opinion.

The course should include a thorough lecture and recitation course of at least thirty-six hours covering the work given in such standard texts on immunity as Zinsser, Kolmer or Simon.

This should begin with the discussion of infection and the problem of virulence. Too much emphasis cannot be laid on this important phase of the problem. The student must be able to understand that pathogenic bacteria possess defensive powers against the defensive forces of the body and are capable of utilizing these to overcome body resistance, thus making infection possible.

The types of immunity should be thoroughly discussed and the student should have well fixed in his mind what these are and how they are brought about. The action of the toxins and the theory of antitoxin production, as advanced by Ehrlich, must be thoroughly understood by the student and until he has such knowledge he should not be permitted to take up the study of the second and third order, antibodies, since only by clear conception of antitoxin production can he be expected to master the theories of the development of the more complex antibodies.

The practical and commercial methods of antitoxin production should be presented to the student, and in his laboratory course he should be permitted to put into practice the methods learned in the text-book, by actual production of some antitoxin, such as diphtheria or ricin. The phenomena of agglutination and precipitation, both in theory and in practical application as diagnostic means, should be mastered by the student. The practical application is to be brought out by laboratory demonstration and exercises carried on in the laboratory course. The bactericidal properties of blood serum, cytolysis and sensitization demand painstaking study. The nature and action of complement and amboceptor and the relationship of these two to antigens are to be brought out by discussion and by laboratory practice with the complement fixation and related tests. Ability to conduct a Wasserman test should be one requisite of the laboratory course. Phagocytosis and chemotoxis and the relation of these to immunity should be clear to the student. In the laboratory he should demonstrate the action of opsonins by the Wright method and should supplement this by the actual preparation of autogenous bacterins for some pyogenic infection and should follow up this work in clinic by the administration of these bacterins to a case under his observation.

The fundamental facts of anaphylaxis, together with theoretical consideration of the same, with particular emphasis laid on the relationship of anaphylaxis to infectious disease and the bearing it has on problems of infectious disease and the clinical significance of anaphylaxis merit considerable time spent on the study of this phenomenon. The course is to be rounded off by consideration of the therapeutic immunization of animals for different diseases and by discussion and interpretation of the allergic reactions.

Give the student such a course and it will not leave him an easy prey to the unscrupulous or grasping commercial man. Our courses in immunity and pathogenic bacteriology should not leave the student a menace to himself and the community through an ignorance of proper and sufficient knowledge of a very profound subject, making him untrustworthy in his diagnosis and in his prophylactic and therapeutic efforts and especially in his practice of this phase of medicine and interpretation of the related phenomena, nor, on the other hand, should it leave him pessimistic and hypercritical in regard to the true value of serum diagnostic methods and allergic tests often improperly

interpreted, or of the effectiveness of or the proper indications for serums and vaccines which science and practice have established. He should be influenced by his training to experiment judiciously, on the one hand, and, on the other, not to injudiciously utilize methods or materials under the guise of experimentation, as is frequently the case in veterinary practice, which is nothing more nor less than malpractice.

Chas. Murray,
L. W. Goss,
Ward Giltner,
Committee.

Report of Committee on Entrance Requirements.

This association was organized to consider and encourage primarily higher standards of veterinary education, of which preliminary education is a very important part. Undoubtedly, the question as to the proper degree of education a prospective veterinary student should have attained before being permitted to enroll in a veterinary college will always be more or less debatable. Even if all veterinary colleges were on a uniform basis of fifteen units of high school work as an entrance requirement, we should soon be debating the question as to whether further increases in this standard should not be considered. That, however, is a question for the future and undoubtedly our present attention should be centered upon the creation of a uniform standard of fifteen units of high school work as a requirement of all veterinary colleges in this country.

In considering entrance requirements there usually are two opinions prevalent among veterinarians and teachers: One is that we should begin our professional education at a point where the high schools complete their work; the other contention is that we should require the minimum amount of preliminary education which is rather indefinite but usually the smallest amount that can be required and still the school receive recognition at the hands of the Bureau of Animal Industry and at the present time in the Surgeon General's office. In advocating the higher entrance requirements we should be guided by three principal factors: First, is the requirement reasonable and can and will it be met by a competent and desirable class of young men; second, is it the proper thing to do so far as the welfare of the live stock industry is concerned, and, third, is it best for the veter-

inary profession itself and the professions with which we must associate?

In answer to the first question we need but take the records of veterinary colleges which have gone from eighth grade requirements to the fifteen high school unit standard. In brief, the figures indicate in all cases that there is a temporary decrease in enrollment, but that within a few years' time the enrollment reaches the former figure and, in most cases, exceeds it. Thus any contention that the high school requirements would not enable the colleges to supply the requisite number of veterinarians for our country is without foundation.

In answering the second question, experience will also be a valuable assistant. Some adherents to a low standard requirement would have us believe that, so far as veterinary education is concerned, there are two distinct types of young men, one who is a practical, hard-working young man who has the qualities which enable one to make good under a handicap, and the other one with education, not accustomed to work and without any practical inclination. We can rest assured that these young men all belong to one and the same class, and the only difference is that one class has had greater educational facilities and thus has the advantage in training and mental discipline which enables him to assimilate and use to a much greater advantage the education that is offered in a professional school. Upon graduation such men are of much greater service to the stock man, state and nation, as well as living a larger and more beneficial professional life.

The third question as to which standard is best for the veterinary profession itself and its relation to other professions is one that depends upon the opinion of those whom the profession serves and upon the character of the young men entering the profession, as well as the confidence and respect shown them by our sister professions. Some would have us believe that a successful veterinarian should be one who is a combination of a horse jockey, a cow puncher and a person that knows a little about medicine. Such a person cannot be accepted as a professional man by any other profession, nor by the veterinary profession itself, if it desires to have the confidence and respect of an enlightened public. If a thorough preliminary education makes a student impractical and develops a dislike for the kind of work that the members of our profession are required to do, no such cases have been brought to our attention.

It has been observed, however, that more thoroughly educated men do their work in such a way as to place it on a skilled and technical basis and to remove it from the realms of empiricism. So great has been the improvement in the students and graduates of some state institutions that most of the faculty members would prefer to enter into some other line of work than to attempt to instruct a group of half-educated students.

It has been suggested that the amendment offered at Kansas City prescribing fifteen units of high school work for entrance as one of the regulations provided by the A. V. M. A. should be modified to conform with the ruling of the Surgeon General "and thus establish once and for all the policy of the American Veterinary Medical Association." This suggestion is not different from past suggestions because it simply recommends that we adopt the least possible requirement and get recognition at the hands of the government. It is doubtful whether the Surgeon General or the Bureau of Animal Industry cares to be put into the position of dictating the entrance requirements for all the colleges whether or not it concerns schools which graduate men engaged under them. Even more doubtful is it whether or not the profession as a whole as represented by the American Veterinary Medical Association ought to shirk the responsibility which is really the profession's problem and not the question of one or two branches of our government. It is a shame and disgrace that the profession itself does not have the courage to provide the necessary educational requirements but that we must be constantly compelled by government regulation to provide even a low standard. It is a plain issue not difficult to understand by those who care to study it carefully, and it should be faced squarely. Your committee recommends that this association most heartily endorse the amendment offered by Dean A. L. Klein at the Kansas City meeting, which is as follows:

"Beginning with the collegiate year of 1918-19, the matriculation requirements of an approved veterinary college shall be not less than one year of high school work or equivalent studies taken in other preparatory schools. Beginning with the collegiate year of 1919-20 said requirements shall be not less than two years of high school work or equivalent studies taken in other preparatory schools. Beginning with the collegiate year of 1920-21 the matriculation requirements shall be not less than four years of high school work or equivalent studies taken in other preparatory schools. Provided, that candidates for ad-

mission to approved veterinary schools who cannot present a satisfactory certificate from the proper official of the school or schools attended covering the required amount of preparatory work may be admitted upon passing satisfactory examinations in subjects included in the corresponding years of a high school course. Certificates must show in detail, and by school years, the subjects studied, the number of hours and the number of weeks devoted to each, and the grade obtained in each; said certificates to be available for examination by the committee on intelligence and education of this association. And, provided further, that no student shall be admitted to advanced standing except upon the presentation of a certificate of honorable dismissal from the proper official of the school previously attended and a certificate from the same official showing in detail the studies completed, and, in such cases, credit shall be allowed only for equivalent studies in which the candidate has obtained a passing grade; all other studies shall be taken over. And, be it further provided, that no credit shall be allowed for studies taken in veterinary schools which are not approved by this association. All certificates shall be available for examination by the committee on intelligence and education of this association."

C. H. Stange, for Committee.

Report of the Committee on Methods of Teaching Pharmacology and Therapeutics.

Object.—With the exception of some purely scientific and interesting work for the physiologists, the only reason for teaching or studying the subjects of pharmacology and therapeutics is in their application to the treatment of disease. Your committee believes, therefore, that the instruction in these subjects should be made as practical as possible. It is quite generally conceded that the study of pharmacology is about as uninteresting as any in the veterinary curriculum. Interest can be kept up to some extent by a fairly close application of the principles of the use of the various agents in the treatment of sick animals.

We have considered the subject of pharmacology in the broad sense to include both Materia Medica and Pharmacology proper and will therefore discuss materia medica, including pharmacy, pharmacology and therapeutics.

Materia Medica and Pharmacy. These subjects can be best taught in the laboratory, as it is impossible to become familiar

with them in any other way. The course should include the principles of manufacture and actual manufacture of one or more preparations from each pharmaceutical group; exercises showing solubility and incompatibility of the more important groups, together with a study of the physical characteristics of the more easily recognized drugs. The following deserve a little further attention.

Solubility. The general solubility of the more important drugs should be tested in the laboratory. We realize that it is impossible to learn or remember more than a relative solubility—that is, whether a drug is soluble in water, alcohol, glycerin, etc., and whether freely or but slightly soluble. As a rule, this is all that is desired or should be expected and is sufficient for ordinary work. Solubility is useful to a veterinarian only so far as compatibility is concerned and is important only in prescribing and dispensing drugs. On this account the commonly used drugs should be carefuly studied and but little stress placed upon those which are seldom employed.

Incompatibility. Incompatibility is a subject usually considered very difficult to learn, but for working purposes is not so hard. Chemical incompatibility is the one which gives the most concern. We realize that there are almost any number of agents chemically incompatible with each other, yet with the present tendency to combine but few drugs in a prescription, there are few which are likely to be met with in actual work. The subject can be very effectively taught by a few exercises on the different groups of drugs, showing the most common incompatibilities, as acids and alkalies, tannic acid and metallic salts, silver nitrate, reducing agents, alkaloids, etc. These exercises may be supplemented by class work, pointing out that the application of chemistry is much to be preferred to the individual incompatibles for each drug.

MATERIA MEDICA. Under this head will be included characteristics and doses. It is obvious that nearly the entire subject of materia medica should be taught in the laboratory.

Characteristics. Students should have an opportunity to see, handle, make tests of solubility and incompatibility and prepare concise notes on the physical characteristics of the different drugs. While we realize that it is impossible to detect many drugs by their physical characteristics, nevertheless, the fact that students can see and handle them enables them to become more or less familiar with each and to be able to identify some of the more

common drugs with pronounced characteristics. The actual tests for purity and identity are of great importance to the pharmacist but not to the veterinarian.

Doses. Doses is a subject of much controversy. Some authorities advocate rather large ones and others fairly small. While an exact dose would be ideal, we know that there is no such thing and that average doses or safe doses should be accepted, with the idea of impressing upon the minds of the students that it is necessary to give to dose effect or until the desired action is produced. No one can tell the exact dose of drugs. Conditions vary greatly and the desired action is so different that only experience gained in actual practice will determine the doses required.

PHARMACOLOGY PROPER. This in a restricted sense means the action of drugs. It is very important because a practitioner should know not only that a drug does so and so, but also how it produces this action. Laboratory work with experiments upon animals we believe the ideal way of teaching this subject. We believe, further, that seeing the action of a drug most vividly impresses its action upon the minds of the students and shows what may be expected from average doses. In this way, antidotes, both chemical and physiological, may be demonstrated.

While purely experimental work in pharmacology requires a good knowledge of physiology and considerable surgical ability as prerequisites, the most important action of many groups of drugs may be demonstrated without killing the animal and with little or no apparatus; as the rapid purgatives, eserine, arecoline, etc., drugs acting upon the eye, upon the nervous system, digestive system, the belladonna group, etc. On the other hand, those experiments demonstrating action upon blood pressure usually require considerable apparatus and result in the death of the animal. Yet these experiments may be worked as demonstrations and will prove well worth while.

The laboratory work should be supplemented with class work either in the form of lectures or recitations to bring out details which cannot be brought out in the laboratory and at the same time to couple up the action of the various agents with their use in the treatment of disease. So far as possible, the laboratory work in both materia medica and pharmacology should be correlated with the matter gone over in class.

The pharmacology of a drug should include the pharmaceutic preparations—that is, the forms in which it may be procured, doses, methods of administration, its action upon the

different systems of the body, its most important action, how the action is produced, any untoward or side actions, toxicology, including symptoms, diagnosis and treatment and the uses. Stress should be placed upon the more important groups and the more important members of each group and their method of action in the treatment of disease. This greatly aids in teaching the subject and in keeping the interest of the students because they will see the importance of the action, as well as the use. Furthermore, they will never be able to use medicines to the best advantage without knowing their action. One must know the finer details of action because there are so many factors which must be taken into consideration in prescribing in different conditions.

THERAPEUTICS. Therapeutics may be defined as that subject which treats of the cure or alleviation of disease. It is the subject with which we are vitally concerned because without therapeutics there would be little or no use for any kind of medicine. Furthermore, there would be but little work for veterinarians if their work stopped with diagnosis and prognosis.

Therapeutics may be taught and should be taught in three places, each almost as important as the other. They are by class work in the principles involved in connection with pharmacology or separate, in the subject of medicine and in the various clinics.

Class Work in Therapeutics. With the exception of the underlying principles of treatment, it is impossible to deal in more than a general way with the subject of therapeutics in class work. Students should be instructed in the principles of therapeutics—i. e., what is desired in certain conditions, how drugs or other means act in various pathological conditions and why we need a certain line of treatment in these cases—rather than to be taught to use a few drugs for certain diseases. In other words, it should be impressed upon the minds of the students to use rational therapeutics or treat the pathological conditions as manifested in each case, instead of relying upon empirical treatment. We should also discourage the use of pet prescriptions for this and that, but encourage treatment of each case individually. This is not so difficult as it seems because we assume that a student will know or understand physiology and pathology and then if he knows pharmacology and the principles involved it is not difficult to prescribe intelligently. Taking the case of a disease like eczema, for an example, it is not enough to have

several prescriptions to use in this disease, but it should be pointed out that the treatment must vary with the pathological changes encountered, whether moist or dry, acute or chronic, etc., since what will prove of excellent value in one case may be detrimental in another.

Prescription Writing. Your committee believes that considerable practice should be given to prescription writing. Practice in this work gives an opportunity to make different combinations for various conditions. It will also aid in forming the habit of thinking a prescription when dispensing medicine instead of placing several ingredients in a bottle or paper and telling the owner to give a certain amount without knowing what each dose will be. If the instructor will not criticise too severely much profit can be gained from this work. Emphasis should be made that in the present light of medicine there is no place for the old shotgun or blunderbuss prescription, but that this has been replaced by one of few drugs upon which dependence can be put for doing what is desired. Any prescriptions given should be presented with the idea that they are only representative and only show the various ways in which drugs may be combined.

Medicine. Therapeutics should be thoroughly considered in the study of medicine. In this subject the various diseases are discussed, including symptoms, diagnosis and treatment. As a usual thing, the diagnosis and symptoms are thoroughly discussed and but a small amount of attention given the treatment. Treatment should, however, be as carefully discussed as the other two. One teaching medicine should not be content with mentioning certain agents in the treatment of a disease, but should explain why they may be used and what results may be expected from their use.

Clinics. The various clinics are the only places in which applied therapeutics may be taught. They may be likened to the so-called bedside therapeutics in human medicine. Patients are brought to clinic for treatment. They offer opportunity for instruction in examination, diagnosis, prognosis and treatment, and the last is of most importance to the owner. The clinics are the only places in which we can couple up the various pathological conditions with actual treatment instead of basing therapeutics on supposition and theory, as must be done in the class room study of therapeutics or medicine.

SUMMARY.

1. Materia Medica and Pharmacy should be largely taught in the laboratory.

2. Pharmacology should be taught in both laboratory and class room. The greater amount of instruction in the laboratory the better.

3. Therapeutics can only be superficially taught in the class room and should therefore be rounded out in the study of medicine and in the clinics, the latter of which may be compared to laboratory work where the students are able to observe the results from the use of various therapeutic measures.

H. J. Milks.

DOMINION VETERINARY MEAT INSPECTORS' ASSOCIATION OF CANADA.

On March 15 the D. V. M. I. A. of Canada met in the Ontario Veterinary College to hear Dr. Geo. Hilton of Ottawa give an address on "The Work of the Veterinarian in the Field." He described all the contagious diseases and told how they were handled according to regulations. He also showed a number of lantern slides on the work. It was all instructive and much enjoyed by all.

Dr. Fowler of Toronto was next called and gave us an address on his new treatment of tetanus. He treats with the serum and makes the injection into the spinal cord direct, between the lumbar and sacral vertebræ. This treatment has been very successful, as he has lost only one case out of twenty-eight. This was very interesting to all, as it was something new.

Dr. McGilvray was next called and gave a few remarks.

Moved by Dr. Torrie, seconded by Dr. Weaver, that a hearty vote of thanks be tendered the speakers. Carried.

On March 22 the association met for general business and election of officers. Minutes of last meeting read and adopted.

Communications were then read. First from Edmonton branch, asking us to request the department at Ottawa to assist them in installing a library there. It was decided that it would be best for them to communicate direct first before asking our assistance. The secretary was instructed to inform them of the decision.

Second, from Dr. Barnes, saying that he would attend the civil service convention in our interest.

Third, address from our president, Dr. D. R. Bone of Edmonton, was read. This was a very interesting and helpful address and showed that he had spent a lot of time and thought on it. It was received with applause and a clap of hands. Moved by Dr. Irvine, seconded by Dr. D. C. Tennent, that the secretary write an appreciation of his endeavors in preparing this splendid address.

Fourth, a motion from the Edmonton branch that this address be sent to every member. Some of the suggestions in this address were discussed, especially the publishing of a paper in connection with our work. It was decided to send the minutes of each meeting to the American Veterinary Medical Association Journal.

Applications from eleven new members were read. Moved by Dr. Weaver, seconded by Dr. Fisher, that applicants be accepted. Carried.

Moved by Dr. Irvine, seconded by Dr. Thompson, that all branches of our organization pay their per capita tax to our association and we to pay the total to the Civil Service Federation. Carried.

After a lot of discussion on the salary of the secretary, it was moved by Dr. Weaver, seconded by Dr. Wingate, that the position of secretary be honorary. This was defeated.

Some complaints were heard about the meetings being held on Saturday night and it was left for the executive to try out a meeting on a Wednesday night.

Dr. Cook then named Drs. Tanner and Maxwell as scrutineers for the elections, with the following results:

President—Dr. R. H. Cook.

Vice President—Dr. D. C. Tennent.

Secretary-Treasurer—Dr. Wm. Tennant.

Executive Committee—Dr. R. J. Thompson, Dr. A. G. Murray, Dr. E. L. Frechette.

WM. TENNANT,
Secretary-Treasurer.

RETIRING PRESIDENT'S ADDRESS.

In most organizations such as ours the office of president is generally only an honorary one, but our constitution has imposed upon the occupant of that office certain duties, which I have endeavored to fulfill to the best of my ability. Whether or not I have succeeded I leave to your good judgment.

As you are aware, early in the year our department transferred me from Toronto to Edmonton and our worthy vice presi-

dent, D. R. H. Cook, has filled the president's chair at Toronto meetings in a very able manner.

I wish to thank each one of you for the very great honor you have reposed in me in electing me for four succeeding years to the most honorable position in your association. To fail to mention the names of those who have held office with me during my term as president would be to fail in my duty entirely, and prove myself ingrate or wholly devoid of appreciation; therefore, I especially wish to thank Dr. Cook; Dr. Fisher, who stayed at the helm through more than one stormy session; Dr. Tennant, who later assumed the office of secretary, and the various members of the executive committee for their unselfish and whole-hearted support which has been so effective in building upon a sound and lasting foundation the Dominion Veterinary Meat Inspectors' Association. To these gentlemen I wish to express my thanks for being instrumental in bringing to a satisfactory completion various questions which it has been the object of our association to attain.

To the officers whom you are about to elect for the coming year let each one of us give the most loyal support. As your retiring president I would also solicit your most loyal support to the Canadian Meat Inspection Service, ever conscious of our duties and responsibilities towards the service, which, to say the least, we are proud of.

In the minutes of your December meeting at Toronto I note a call for suggestions for ways and means of inducing a number of members to attend the regular meetings of the association. Why, let me ask, should we be forced to look for some inducement in the form of entertainment? After what our association has done, and is doing, to improve conditions in the service, the inspector who continually absents himself from the meetings is not fair to himself. Honest membership makes an inspector a better man and more efficient; the spirit of unity brought about by membership in our organization makes for harmony at a plant and results in better performance of duty. Our departmental heads must also realize that there is something radically wrong with a man who cannot attend the meetings in so just a cause as the association is engaged in, that such a one in shirking his duty towards the association is capable of shirking his duty towards the department's service also.

With reference to enlarging the attendance at meetings, as also increasing membership in the association, let me suggest the

need of an official organ in the form of a bulletin or journal issued by the D. V. M. I. A. It seems imperative that some system be inaugurated whereby complete news of what is being done within the association may be disseminated and thus bring into more intimate touch the members who I am glad to say are now located in every province of our Dominion. Such a system would also be of service in stimulating the social nature of our activities and I would suggest that this be regarded as a stepping-stone towards greater development of the organization. I would recommend that the incoming officers give this matter their early consideration.

In regard to organization in the West, I may say our appeal for membership in Western Canada has already met with a hearty response which is encouraging. With the exception of one inspector, whom we expect to have on our membership roll in the near future, all veterinary inspectors in Vancouver, Edmonton, Calgary and Prince Albert are members of the Dominion Veterinary Meat Inspectors' Association. A good, active branch association has been formed in Edmonton, at which papers are read every two weeks. These papers are of a high calibre, instructive and interesting, and the fact that all members are regular attendants and each one enters into the discussion speaks well for the Edmonton branch of the D. V. M. I. A., as also the Canadian Meat Inspection System. A feeling seems to have gone abroad in Winnipeg that if the inspectors there did become members of the association their voices would not be heard in the conduct of the organization. I believe that it is on this account that our appeal for membership from Winnipeg has met with little response. Let me assure any who may in this manner misunderstand the objects of the D. V. M. I. A. that the organization is composed of veterinarians appointed under the meat and canned foods act in all and every locality in the Dominion and that each member already has and will continue to have a say in the workings of the association. It is our desire that every veterinary meat inspector in Canada become a member of the association. No man can live to himself; let us coöperate; the greatest good to the greatest number.

"Community of interests" is the dominant note in the tune to which the industrial and business world, in common with our allied armies, are marching today. It is the realization of this fact which has resulted in that splendid coördination of allied power and resources which is, perhaps, the most striking feature

of the present world struggle. Success in any line of endeavor is admittedly largely a question of organization and to organization we must look for the realization of our hopes in the future. The objects of the Dominion Veterinary Meat Inspectors' Association officially stated are: To unite fraternally all veterinary meat inspectors employed by the Department of Agriculture; to secure by discussion of topics pertaining to meat inspection a uniform interpretation of the departmental rules and regulations and thus promote efficiency of the service; to secure through coöperation with the Department of Agriculture more equitable salary rates and regulation of hours of labor; to obtain for its members full benefits of all laws existing and which may be hereafter enacted, and by upholding all civil laws. Wherever in the lives of men conditions obtain which require remedial action, experience shows that somehow, at some time, an attempt will be made to rectify and adjust. The D. V. M. I. A. has made and will continue to make that attempt and, while not at all times acquiring our objective, yet not without a measure of success, which is indeed gratifying. While, unfortunately, the meat inspector does not enjoy a seven to eight hour a day service, as most other occupations, and while the work of an inspector is dangerous in that he is so continuously exposed to infection from diseased portions, together with conditions under which post-mortem work is performed, at times somewhat disagreeable, still in a happier day that is not too far distant we hope to see a wider interest manifested in developing conditions which will be more becoming professional servants. Since its inception our association has seen a marked improvement in the condition of employment amongst inspectors. For this it can justly claim a great deal of credit. Looking back over the past four years, we note that pay for overtime has been accomplished, minimum salary advanced from twelve to fourteen hundred dollars per annum, the maximum salary from eighteen hundred to two thousand. It is to the credit of the association that I announce these changes which I am pleased to say have been brought about by coöperation with the Department of Agriculture.

If the D. V. M. I. A. was to be judged by what it has done in the betterment of financial conditions that alone would justify its existence. In order to maintain the efficiency of our government meat inspection system, it is necessary that the salary and working conditions for the professional men approach a standard somewhat commensurate with the opportunities for

veterinarians in other fields of endeavor. In this connection it is gratifying to know that the Civil Service Commission has at present under consideration a professional class of salaries, as well as an improvement in conditions. Our interests at Ottawa are being represented by our honorable vice president, and I am sure I voice the sentiments of every veterinary meat inspector, whether a member of this association or not, when I say we trust his efforts may be highly successful and for that end we will ever pray.

I would not consider this address complete without making reference to the death of Dr. John Webster Smith, which occurred in Edmonton, in October of last year. Dr. Smith, whose home was in Newmarket, Ontario, was deeply interested in the success of the association, a promising member, and, although only a short time with us, he earned the respect of all who were fortunate to come in contact with him. It is with profound regret that I announce his early demise, which was a shock to all who knew him. At the time of writing this address news has come to me of the death of Mrs. George A. Nichol, wife of one of our members. Dr. Nichol has for some time been stationed in Calgary, but later was transferred to Edmonton. On behalf of the association I wish to extend to Dr. Nichol our heartfelt sympathy with him in this sad bereavement.

In conclusion, let me say that during the four years of the presidency I have seen many ups and downs in the association. My decisions, which perhaps have not at all times concurred with those of the majority, have, I assure you, been formulated conscientiously and with the best motives in view, and the addresses which you have received from time to time have carried with them the interests of the association first and at all times. I would ask you gentlemen to accept my resignation as an office-holder in your organization and to the officers to be elected for the ensuing year I wish to extend my good wishes for a most successful term; I would pledge to them my continued loyalty to my unabated interest in the advancement, growth and development of the Dominion Veterinary Meat Inspectors' Association of Canada.

Gentlemen, I thank you. D. R. Bone.

Dr. W. N. Gaston has received his discharge from the army after having been stationed at Fort Riley, Kansas, and Camp Lee, Virginia, and is now located at Seneca, Kansas.

NECROLOGICAL.

DR. CHAS. A. WALDRON.

Dr. C. A. Waldron, Tecumseh, Michigan, died recently rather suddenly as the result of nephritis. The Doctor was one of the oldest practitioners in the State of Michigan. Formerly he was a member of the State Examining Board and of the Michigan State Association.

DR. WILLIAM H. SERIGHT.

The Journal has just received notice of the death of Dr. Wm. H. Seright of Atlanta, Georgia. Full details have not reached the office, but we understand Dr. Seright was born at Pleasanton, Kansas, in 1879. His education was begun in a common school and continued in the Kansas State Normal School. He was graduated from the Kansas City Veterinary College in 1910 and joined the A. V. M. A. in 1917.

DR. JOSEPH T. NATTRESS.

Dr. Joseph T. Nattress, one of the most prominent practitioners in the state of Illinois, died at his home at Delavan on March 19.

Dr. Nattress was a graduate of the Ontario Veterinary College in the year 1885 and joined the American Veterinary Medical Association in 1904.

Dr. Nattress has taken a very active part in all matters pertaining to veterinary progress in the state of Illinois, and was one of the most influential veterinarians in that state. He was a man of sterling integrity, took a decided stand on every question for veterinary advancement. Dr. Nattress was planning to attend the next A. V. M. A. meeting in New Orleans with his wife. His death will be a great loss to the profession, not only in Illinois, but the nation.

DR. W. C. KRAEMER.

Dr. W. C. Kraemer, a lieutenant in the 307th Field Artillery, died recently, in France, of pneumonia. Dr. Kraemer was a graduate of the Veterinary Department of the University of

Pennsylvania in the year 1916 and joined the A. V. M. A. the same year. Dr. Kraemer was associated with Dr. E. P. Althouse of Sunbury, Pennsylvania, before he entered the army service.

WILLIAM RANSDELL GOODWIN.

William R. Goodwin, former vice president of the Sanders Publishing Company and managing editor of The Breeder's Gazette, Chicago, died on April 5 at his country home, Oakhurst, near Naperville, Illinois, in his fifty-sixth year.

Mr. Goodwin was born at Brookville, Franklin County, Indiana, August 19, 1863, and was the son of the late Rev. Dr. William R. Goodwin, of the Methodist denomination, who was president of a college at that place.

Mr. Goodwin was educated in the public schools of Quincy, Danville and Decatur, Illinois, and early matriculated at Illinois Wesleyan University, Normal, Illinois, where he studied for three years. He completed his college course at the DePauw University, Greencastle, Indiana, in 1883, receiving his B. A. degree. In 1886 his Alma Mater conferred upon him the advanced degree of Master of Arts.

At the time of his death, Mr. Goodwin had been associated with The Breeder's Gazette for something like thirty-four years, and all who have been readers of that splendid journal can testify to the magnificent work performed by the late managing editor in the upbuilding of the live stock interests of the country through his wonderful store of information along these lines, and his facile pen.

Mr. Goodwin was a true friend to the veterinary profession, and always anxious for its advancement along progressive and scientific lines to meet the ever-increasing needs of our advancing live stock industry. Just previous to the annual meetings of the A. V. M. A. it was his frequent custom to remind the writer to send him a report of the proceedings to be published in the Gazette, which evidenced the interest he always manifested in the profession. It would be utterly impossible, in a short obituary notice, to do justice to the work and accomplishments of this able and good man, who will be missed from ocean to ocean, as well as abroad; in fact, wherever the Gazette is read, and that means the world over, where progressive live stock husbandry obtains.

The deceased was buried, April 8, in the village cemetery within sight of his former stately Oakhurst home, where hundreds of his friends and associates gathered to pay their last tribute of

respect; and, to quote from the story of his life in the Gazette, to which he devoted the greater part of it: "No massive stone yet marks the place, but in the hearts and minds of thousands of American farmers and stock breeders" (and, we might add, veterinarians) "there is already a monument more imperishable than granite to his memory."

Mr. Goodwin leaves a widow and one son, who is at present a student at the University of Chicago. W. H. D.

REVIEWS.

REPORT OF NEW YORK STATE VETERINARY COLLEGE, CORNELL UNIVERSITY.

This is the usual annual report and it summarizes the year's work. In the medical and ambulatory clinic 3,210 cases were handled, 718 in the consulting and surgical clinic, and 393 in the small animal clinic. A few unusual cases are described in detail.

The diagnosis department made 1,337 examinations. Classified and named in the order of preponderance of numbers, the cases examined include poultry diseases, rabies, tumors, glanders, anthrax, actinomycosis, parasites, blackleg, tuberculosis, hemorrhagic septicemia, blackhead, and Johne's disease.

During the year the college sent out 72,007 doses of tuberculin, 15,435 doses of anthrax vaccine, 15,374 doses of hog cholera serum, and 6,087 doses of mallein.

Researches on the Diseases of Breeding Cattle, by W. L. Williams and C. M. Carpenter, describes additional investigations conducted during the year, and correlates these with past work. Valuable data are submitted and a thoughtful and interesting interpretation is made. Whether or not the reader finds himself able to follow the authors from the data submitted to the conclusions reached, the article furnishes abundant food for thought.

Handling an Outbreak of Calf Scours and Pneumonia, by C. M. Carpenter, is a paper of special interest and value to practitioners in dairy districts. It describes the general hygienic measures adopted, mentions the indications for the use of serums and bacterins, and gives in detail the results obtained in handling a large and badly infected herd. It also records a bacteriological study of individual cases.

The Paranasal and Facial Sinuses of the Sheep, by G. S. Hopkins, Department of Anatomy, gives brief and accurate descriptions and excellent illustrations. Likewise an article by E. Sunderville, also of the Department of Anatomy, on the digestive anatomy of the sheep, is especially adaptable to the need of the times.

Certain Aspects of the Pathology of Spavin, by S. A. Goldberg, Department of Pathology and Bacteriology, deals briefly with rather extensive researches relative to the origin, nature, and development of joint lesions. It is a valuable contribution to the literature on this subject. Foreign Bodies in the Tissues with a Report of Six Cases is an additional paper by the same author.

A Preliminary Report on the Urine Analysis of the Dairy Cow, by C. E. Hayden, Department of Physiology, reviews past work, describes methods, and suggests a tentative standard for normal urine, based on the examination of fifty samples. Orokinase and Salivary Digestion in the Horse, Cow, and Pig, by B. J. Finkelstein, of the same department, describes researches that clear up some doubtful points relative to salivary digestion.

Horseshoes of Interest to Veterinarians is a paper by Henry Asmus, Department of Horseshoeing. This illustrates and mentions briefly the use of 151 types of shoes designed to correct various faults of conformation and gait. Some of the shoes were designed by the author.

The Strongylidæ Affecting the Horse, by W. A. Hagan, Department of Pathology and Bacteriology, gives a general classification of the entire family (Strongylidæ), together with a more detailed study of the life history and appearance of the species that infest the horse and inflict damage. The author refers to a rather common error in describing aneurisms in the mesenteric arteries to invasions of *Strongylus equinus*. *S. vulgaris* is stated to be the real offender. R. R. BIRCH.

PUBLICATIONS RECEIVED.

Report of the Dean of the New York State Veterinary College, New York University, for 1917-1918.

Report of the New York State Veterinary College at Cornell University, for 1917-1918.

The Veterinary Alumni Quarterly of the Alumni Association, College of Veterinary Medicine, Ohio State University, Columbus, March, 1919.

Philippine Journal of Science, Section B, Tropical Medicine, November, 1918.

Recueil de Médecine Vétérinaire (Alfort).

Revue Generale de Médecine Vétérinaire (Toulouse).

American Journal of Clinical Medicine (Chicago).

Veterinary Record (London).

Veterinary News (London).

Veterinary Journal (London).

Revista de la Sociedad de Medicina Veterinaria (Buenos Aires).

La Clinica Veterinaria (Milan).

MISCELLANEOUS.

OKLAHOMA NOTES.

Dr. C. R. Osborn, who has been located at Chickasha doing hog cholera control work for the last year, has been transferred to Sioux City, Iowa.

Dr. W. P. Shuler has been appointed as a deputy state veterinarian and will give his time to tuberculosis control work under the recently enacted law. The Doctor took unto himself a wife in the person of Miss Catherine Linning on March 26. It is expected that they will continue to reside in Oklahoma City.

Dr. J. P. O'Connor, Inspector in Charge of Hog Cholera Control, is spending his vacation at Vinita.

Dr. Arthur W. Deem has been honorably discharged from the Veterinary Corps and has located at Fairview.

Several owners of hogs are bringing suits against various serum producers for damages alleged to have resulted from the administration of anti-hog-cholera serum.

We are finding very little of the old-fashioned kind of hog cholera, but there is plenty of what appears to be swine plague or "mixed infection."

Dr. Evard A. Dean, recently connected with the army meat inspection service, is now attached to the meat inspection force at Oklahoma City. He has been suffering from a severe attack of influenza.

J. S. Grove, Resident State Secretary.

(Won't other Resident State Secretaries emulate Dr. Grove's example and furnish the Journal interesting news notes?—Ed.)

Captain Robert Porteus has received his discharge from the army and is now located at West Lafayette, Ohio.

Dr. Ben Howes, for more than twenty years a veterinary inspector in the Bureau of Animal Industry, has resigned to engage in farming in Orleans County, New York. The vacancy caused by his resignation has been filled by the detail of Dr. Samuel W. Schuppan of Buffalo, New York, to Beesher Falls, Vermont, where he will supervise the inspection and quarantine of animals imported from Canada into the United States.

Seizures have been effected on the following products: Anti-Choleric Hog Remedy; American Hog Remedy; Snoddy Hog Cholera Remedy; Swine-Lixir; Cal-Sino Hog Restoratitve; National Hog Remedy; S. H. Hog Remedy; AHRA Hog Health Company; B. A. Thomas Improved Hog Powder. These preparations are labeled in such manner as to convey ingredients which could not produce the effects claimed by the manufacturer.

The Journal is in receipt of the drawings and specifications of a choke-removing appliance patented by Dr. O. G. Beck, Remount Department 319, Louisville, Kentucky. The Doctor informs us he will be glad to attempt to answer any questions concerning this new patent of his, as he believes it will be of benefit to the profession.

Dr. U. G. Houck has been appointed Chief of the Division of Hog Cholera Control in the United States Bureau of Animal Industry to fill the vacancy created through the resignation of Dr. O. B. Hess, who resigned to accept a position with the Fort Dodge Serum Company at Fort Dodge, Iowa. Dr. Houck has served in various important capacities during the twenty-two years he has been connected with the Bureau. It was he who inaugurated the hog cholera control work that has been conducted in coöperation with the various states since 1913. When foot and mouth disease broke out in this country in 1914 he was relieved of the position to assume charge of that campaign in the field on account of his previous experience with that disease.

Examinations for registration in veterinary medicine for the commonwealth of Massachusetts will be held at the state house, Boston, Massachusetts, on June 25 and 26. Application blanks may be had of the secretary, Dr. E. W. Babson, Gloucester, Massachusetts.

E. W. Babson, Secretary.

The Wisconsin Board of Veterinary Examiners will give an examination at the Capitol Building, Madison, Wisconsin, June 3 and 4, commencing at 9 a. m., June 3, 1919.

T. H. Ferguson, Secretary.

VETERINARY MEDICAL ASSOCIATION MEETINGS

In the accompanying table the data given is reported by many Secretaries as being of great value to their Associations, and it is to be regretted that some neglect to inform us of the dates and places of their meetings.

Secretaries are earnestly requested to see that their organizations are properly included in the following list:

Name of Organization	Date of Next Meeting	Place of Meeting	Name and Address of Sec'y
Alabama Vet. Med. Ass'n		Birmingham	C. A. Cary, Auburn
Alumni Ass'n College of Vet. Med. O. S. U.		Columbus	W. R. Hobbs, care O. S. U., Columbus, Ohio
Alumni Ass'n N. Y.-A. V. C.		338 E. 26th St.	Jos. A. DeGroodt, Mendham, N. J.
Alumni Ass'n U. S. Coll. Vet. Surgeons		Wash., D. C.	Week beginning Nov. 17
American V. M. Ass'n	Nov. 17-21, 1919.	New Orleans	N. S. Mayo, 4753 Ravenswood Ave., Chicago
Arkansas Veterinary Ass'n			R. M. Gow, Little Rock
B. A. I. Vet. Ass'n of Iowa		Ames, Ia.	F. Jelen, Cedar Rapids, Ia.
B. A. I. Vet. In. A., S. Omaha	3d Mon. each mo.	S Omaha, Neb.	J. V. Giffee, So. Side, Omaha
British Columbia Vet. Ass'n			K. Chester, New Westminister, B C.
California State V. M. Ass'n	June 11, 1919		Geo. H. Hart, Berkeley
Central Canada V. Ass'n			A. B. Wickware, Ottawa
Central N. Y. Vet. Med. Ass'n	June and Nov.	Syracuse	W. B. Switzer, Oswego
Chicago Vet. Society	2d Tu. each mo.	Chicago	A. A. Leibold, Chicago
Colorado State V. M. Ass'n	June 5 and 6.	Fort Collins	I E. Newsom, Ft. Collins
Conestoga Veterinary Club	2d Thu. each mo.	Lancaster, Pa.	H. B. Brady, Sec'y
Connecticut V. M. Ass'n			A. T. Gilyard, Waterbury
Dominion Vet. Meat Inspectors' Ass'n of Canada	3d Sat each mo.	Toronto	Wm. Tennant, Toronto
Genesee Valley V. M. Ass'n		Rochester	J. H. Taylor, Henrietta, N. Y
Georgia State V. M. A.			P. F. Bahnsen, Americus
Hudson Valley V. M. A.			W. H. Kelly, Albany
Idaho Ass'n Vet. graduates			C. V. Williams, Blackfoot
Illmo Vet. Med. Ass'n			L. B. Michael, Collinsville, Ill.
Illinois State V. M. Ass'n			L. A. Merillat, Chicago
Indiana Veterinary Ass'n			G. H. Roberts, Indianapolis
Iowa Veterinary Ass'n		Ames	H. D. Bergman. Ames
Kansas State V. M. Ass'n			J. H. Burt, Manhattan
Kentucky V. M. Ass'n	July 10, 11	Shelbyville	D. E. Westmoreland, Owensborc
Keystone V. M. Ass'n	2d Tu. each mo.	Philadelphia	E. S. Rockwell
Louisiana State V. M. Ass'n			E. I. Smith, Baton Rouge
Maine Vet. Med. Ass'n		Portland	E. E. Russell, Farmington
Massachusetts Vet. Ass'n	Monthly	Quincy House Boston	
Michigan State V. M. Ass'n			W. A. Ewalt, Mt. Clemens
Minnesota State V. M. Ass'n	July 9-10	Brainerd	C. P. Fitch, St. Paul
Mississippi State V. M. Ass'n			J. A. Barger, Jackson
Missouri Valley V. Ass'n		Kansas City, Mo.	R. F. Bourne, Ft. Collins, Col.
Missouri Vet. Med. Ass'n			Chas. D. Folse, Kansas City
Montana State V. M. A.	June 25-27	Butte	A. D. Knowles, Missoula
Nat'l Ass'n B.A.I. Veterinarians	Meet with A. V. M A.		S. J. Walkley, 185 N. W Ave., Milwaukee, Wis.
Neb. Vet. Med. Ass'n			S. W. Alfort, Lincoln
Nevada State Vet. Association		Reno	W. B. Earl, Reno, Nev.
New York S. V. M. Society	July 24-25	Brooklyn	C E. Hayden, Ithaca
North Carolina V. M. Ass'n			J P. Spoon, Burlington
North Dakota V. M. Ass'n			W. J. Mulroony, Havana
North-Western Ohio V. M. A.			C. E. Hershey, Tiffin, O.
Ohio State V. M. Ass'n			R. I. Bernath, Wauseon
Ohio Tri-County Vet. Ass'n			Dr. W. R. Lukens, Hillsboro
Ohio Valley Vet. Med. Ass'n			C. S. Henry, Terre Haute
Oklahoma State V. M. Ass'n	July 7, 8, '19	Oklahoma City	D. W. Gerber, Okla. City, Ok.
Oregon Vet. Med. Ass'n			B. T. Simms, Corvallis, Ore.
Pennsylvania State V. M. A.		Harrisburg	D. E. Hickman, Phila., Pa.
Portland Vet. Med. Ass'n	4h Tu. each mo.	Portland, Ore.	Sam. B. Foster, Portland, Ore
S. Carolina As'n of Veter'ns	Sept. 4, 5	Columbia, S. C.	B. K. McInnes, Charleston
Schuylkill Valley V. M. A.		Reading	C. R. Potteiger, Reading
South Dakota V. M. A			S. W. Allen Watertown
So. Aux. of Cal. S V. M Ass'n	3d Wed. Dec., Mar., June. Sept.	Los Angeles	J. A. Dell. Los Angeles
Southeastern Michigan V. M. Ass'n	2nd Wednesday Jan., Apr., Jul. Oct.		H. Preston Hoskins, Detroit
Southeastern States Vet. Med. Ass'n		Birmingham, Ala.	H. C. Hutchens, Atlanta, Ga.
Southern Tier V. M. A.	July 5	Binghamton	R. R. Birch, Ithaca, N. Y.
Southwestern Mich. Vet. Med. Ass'n			L. A. Winter, Eau Claire Mich.

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"THE VICTORY OVER RABIES."

In a recent number of the Journal of the American Medical Association, under *Current Comment,* a high tribute is paid to the great Pasteur for his classic work in connection with rabies, that dire disease of humanity. Says the Journal:

"Amid the victories of the European battlefields that have thrilled the hearts of all warm-blooded Americans and every lover of democracy throughout the world, we may well pause for a moment to contemplate another type of victory—man's conquest of rabies, the dire disease that once meant a painful end of most of those who were inoculated with its deadly germs. Year after year the reports of the lives saved by the fruits of Pasteur's pioneer labors in combating the microbial enemies of mankind bring the story of the beneficent influence of this great Frenchman's contribution to medical science.

"While the names of great generals and distinguished statesmen are attracting foremost attention in the eyes of all the world, and men are rehearsing the conquests and combats of former great struggles, let us not forget the perennial victory over rabies. During the year 1916, according to a report recently issued, 1,008 persons from the district of Lyons received the antirabic treatment at the bacteriologic institute of that city.

A single death in this list places the mortality at 0.099 per cent. Since 1900, more than 9,000 persons have received antirabic inoculations, with a total of nine deaths, or 0.09 per cent. The story has become an old one; but it will long bear repetition as an eloquent testimony to the blessings of intelligent scientific research.''

We take pleasure in reproducing the above tribute to the great Pasteur, and his never-to-be-forgotten work in the cause of humanity in connection with rabies. We feel, however, that there is an additional phase of the work that should not be lost sight of which has been the means of greatly lessening the number of cases of this frightful malady, in both man and the lower animals, by eradicating the infection itself. We refer to the splendid work of those countries which enacted laws, and enforced regulations, to prevent the transmission of the infection, by reducing the possibility of rabid animals, dogs especially, inoculating people and other animals, thereby eliminating the infection of rabies to a very large extent, and rendering the antirabic treatment unnecessary to a considerable degree. It is well known that for years previous to the Great War, rabies infection did not exist in Great Britain or Ireland, having been completely stamped out, although a few cases have occurred there since the opening of hostilities, which, doubtless, were introduced through a weakening of the quarantine restrictions against dogs from other countries during that country's war stress. There are other European states which, we believe, had a similar satisfactory pre-war record with regard to rabies; and there are still others, we think, Australia, for example, in which the infection never obtained a foothold on account of rigid quarantine restrictions being imposed against dogs of any kind entering the country. So, while all credit must be given to the labors of the great Frenchman, the results of which have saved the lives of thousands of human beings before other measures were being adopted, and are still doing so, the work of eliminating the infection, and so preventing the disease, should be given its due meed of credit, and of which a part, at least, if we are not mistaken, belongs to the veterinary profession.

CYANOGENESIS.

A recent technical bulletin from the Oklahoma Experiment Station, giving the results of a Study of the Cyanogenesis in

Sorghum Vulgare, by Dowell of the Department of Chemistry, suggests the fact that many animals are annually lost, more particularly cattle, as the result of the development of prussic acid in different varieties of plants, and in different localities.

In this country sorghum seems to have attracted most attention, although in other countries, and in some sections of this country, many fatalities occur from the development of this rapidly-poisonous acid, or glucoside, in at least some of the members of the legume family. In the Gulf States region, and especially on some of the bottom lands of the Lower Mississippi Valley, prussic acid poisoning is not at all uncommon amongst cattle grazing on old cow-pea (Dolichos) fields during winter, and especially after a frost; while on the higher lands in the same region, no trouble seems to be experienced from this cause.

Again, while there may be occasional deaths reported from the consumption of "stunted" sorghum, in the Gulf States, they are by no means so frequent as are reported from other sections of the country. In fact, the writer has known of sorghum having been fed in all stages and conditions to farm animals of different varieties without any untoward results whatever.

We have seen reports from European countries of fatalities occurring in cattle from this cause that were fed meal made from Burmah beans, and perhaps some other legumes, chemical analyses having shown the presence of the poisonous principle in the feeding material. Without touching upon the chemistry involved, one would almost be led to believe that the locality and the character of the soil had something to do with the elaboration and development of the glucoside, or the acid, in particular varieties of plants which seem to harbor it, and prove so dangerous to animals consuming them. We have known of cases where, on the same farm, pea vines grazed on bottom lands would prove fatal; while the same variety of peas grown on the higher lands would be altogether innocuous.

Death is usually so sudden that it is almost impossible to obtain any benefit from therapeutic measures, animals dropping dead "in their tracks," so to speak. However, it is possible to lessen, to some degree at least, the number of fatalities by the adoption of precautionary or preventive measures on the part of stockowners. But first of all, and this is the point we are desirous of stressing, viz., that the veterinarian should make himself familiar with this condition in parts of the country where

it occurs, and be able to intelligently advise his client just how to proceed so that he may make the value of his professional knowledge felt in the prevention of a loss in animals that frequently assumes quite large proportions; and as therapeutic measures seem almost, if not altogether, out of the question, one of the first suggestions would be to avoid the use of such fields at a season of the year when grazing on them is dangerous, and turn the growth under for the preparation of some other crop. Or the utilization of the grazing up to the time only when it is apparently comparatively safe, or before the first frost in the Southern section of the country at least.

Another method which seems to have found favor is to permit cattle to partially "fill up" on some other feed before turning them on to these "poisoned fields," in which case the quantity of the dangerous ingesta would be materially lessened, and the untoward results somewhat modified. It has been found also that when conditions were such that cattle were deprived of water for some time in these pea-vine pastures, that the acid seemed to take effect only after the animals had quenched their thirst by partaking of copious draughts of water, when they would die quite suddenly, probably due to dilution of the relatively dry ingesta and rendering the poisonous principle more capable of absorption.

We mention these few illustrations to show that while the veterinarian may be more or less helpless as a therapeutist under such conditions, he may be of untold benefit to the stockowner at times in preventing him incurring very serious losses, if he will only familiarize himself with the predisposing causes which help to bring them about. To the owner of a large number of cattle, the saving of them by preventive measures is a big thing. To the veterinarian who is the means of the stockowner's success, it means a big thing to him also. In fact, it is the big things that count, in veterinary practice as in any other line of endeavor, and are most likely to impress the laity with the real value of the profession. Success in minor matters has its good effect; but success in the larger problems with which the veterinarian has to deal leaves its relatively greater impress upon the minds of those with whom he has to come in contact in his professional capacity.

Dr. A. D. Kendrick has been discharged from the army and has resumed his practice at Homer, La.

STUDIES ON THE HYPERIMMUNIZATION OF HOGS AGAINST HOG CHOLERA.

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INTRODUCTION.

The anti-hog-cholera serum which is now widely used for the prevention and treatment of hog cholera is produced from immune hogs by injecting them with large quantities of defibrinated blood obtained from hogs sick of hog cholera. The blood of the immunes is subsequently drawn, and a preservative added, and this constitutes the serum which is used in practice. In an early publication* the process of hyperimmunization is described as being carried out in two ways: (1) The quick method, which consisted of the injection subcutaneously into an immune hog of an amount of disease-producing blood equivalent to 10 c.c. for each pound of body weight; and (2) the slow method, which consisted of the injection of the immune first with 1 c.c. of disease-producing blood subcutaneously for each pound of body weight, followed after an interval of 10 to 14 days by a second dose, amounting to 2½ c.c. for each pound of body weight, and this in turn was followed by a third injection given approximately 12 days after the second, in the proportion of 5 c.c. of disease-producing blood per pound of body weight.

As will be seen, the injections were made subcutaneously and, in the quick method, 10 c.c. of disease-producing blood per pound of body weight were required to accomplish hyperimmunization, while in the slow method a total of 8.5 c.c. of disease-producing blood per pound of weight were required. There were certain objections to both of these processes.

The quick method required the subcutaneous injection of very large amounts of defibrinated virus blood, the task being found to be difficult to perform and resulting frequently in the development of large subcutaneous abscesses. In the case of the slow method abscesses were likewise produced at times and furthermore a very long period was required to secure hyperimmunization, the time being at least 32 days before the hyperimmunized

* Dorset, M., McBryde, C. N., and Niles, W. B. "Further Experiments Concerning the Production of Immunity from Hog Cholera," Bulletin 102, U. S. Department of Agriculture, B. A. I., January 18, 1908.

hog was available as a serum producer. In order to overcome these objections, the intravenous method of administration was resorted to, and it was shown* that immune hogs could be hyperimmunized satisfactorily by the administration of a single dose of disease-producing blood intravenously, in the proportion of 5 c.c. per pound of body weight. This method of hyperimmunization resulted in eliminating entirely the objections named above and has been, from the beginning, employed in the commercial preparation of anti-hog-cholera serum. In the earlier experimental work hogs which had been immunized artificially by the injection of virus and serum, as well as hogs, which appeared to be natural immunes, or which had recovered from an attack of the disease, were hyperimmunized and their serum tested. It was found that all three classes of immunes yielded a potent serum.

In the early work no consideration was given to the possibility that the length of time elapsing between immunization on the one hand and hyperimmunization on the other might have an important influence upon the potency of the serum. It is a fact, however, as may be seen from the record given in Bureau of Animal Industry Bulletin 102†, that intervals of from 6 to 13 months elapsed between the original immunizations and the hyperimmunizations. In all cases where a proper amount of disease-producing blood was used for hyperimmunization the serum proved to be of satisfactory potency.

In a report for the years 1910 and 1911, Holmes‡ describes certain experiments with improved methods of anti-rinderpest serum preparation. Prior to the time when these experiments were carried out by Holmes, it was customary to produce anti-rinderpest serum by giving susceptible cattle a simultaneous injection of virulent blood and a suitable amount of anti-rinderpest serum. About three weeks thereafter the cattle were given one massive injection of defibrinated virulent blood in an amount equivalent to 10 c.c. per pound of body weight, or they were hyperimmunized by a first injection of about 3.5 c.c. per pound of body weight, this being followed after a period of two to three weeks by a second injection of virulent blood in the proportion of from 7 to 10 c.c. per pound body weight. All of these injec-

* Report of Chief of Bureau of Animal Industry for 1909, p. 53, U. S. Department of Agriculture, 1911.

† L. c.

‡ Indian Civil Vet. Dept., Memoirs No. 3, Rept. of the Research Work of the Imperial Bacteriological Laboratory. Muktesar, during 1910 and 1911.

tions were made subcutaneously. Holmes states that when a susceptible animal is immunized against rinderpest by the simultaneous inoculation of serum and virus it passes through a period of hypersusceptibility which he calls the "negative phase." This is followed by a period of resistance to the disease—"positive phase."

According to Holmes, cattle which were hyperimmunized three weeks after receiving the simultaneous inoculation, received the hypering dose after they had passed through the "negative phase" of the immunity and were in the "positive phase." His conception was that the injection of the massive amounts of virulent blood required in hyperimmunization during the negative phase of immunity—that is, before the body cells of the animal had produced the antitoxin in any considerable quantities—would result in a maximum stimulation of the body cells and therefore in the development of a serum of maximum potency. He believed that when the hyperimmunizing injection was made during the period of positive immunity, the virus, which was injected, combined in part, at least, with the antitoxin which had been developed as a result of the previous immunizing dose and for that reason the stimulation of the cells concerned in antitoxin production was not obtained to the desired extent. In the same paper Holmes describes experiments with virulent blood diluted with 0.5% potassium citrate solution in comparison with defibrinated virulent blood, undiluted, which had been in common use.

As a result of his experiments he reports that hyperimmunization during the negative phase, while the animals were passing through a modified attack of rinderpest as a result of the simultaneous inoculation, resulted in a more potent serum than was obtained by waiting until the reaction following the simultaneous injection has passed away. He furthermore states that a more potent serum is obtained when virus blood is drawn directly into 0.5% potassium citrate solution and injected after hemolysis of the red cells has taken place than was secured by the injection of an equivalent amount of undiluted defibrinated blood. He attributes his success with the diluted blood to the fact that the virus is partially, at least, freed from the red cells through the process of hemolysis, and also to the fact that the diluted blood is more quickly absorbed, thus producing a more rapid effect on the injected animal.

EXPERIMENTAL WORK.

The above described work of Holmes suggested to us that perhaps certain improvements could be made in the production of anti-hog-cholera serum. Perhaps a more potent serum could be obtained if the hyperimmunizing injection was made at the so-called "negative phase" of immunity; or it might be that a considerable saving could be effected by injecting a smaller amount of virulent blood at the time of the negative phase, thus securing a serum as potent as that produced by the ordinary methods but with a smaller expenditure of virulent blood, which is one of the principal items of cost in the production of anti-hog-cholera serum. Furthermore, it seemed possible that hemolysis of the virus blood used for hyperimmunization would result in the production of a more active antigen than the undiluted defibrinated blood which was in common use. The advantage of rapid absorption of the diluted virus blood, upon which considerable stress is laid by Holmes in his work on rinderpest, could not be expected in anti-hog-cholera serum production, because the common practice is to make the hyperimmunizing injection intravenously, thus securing a rapid dissemination of the virus throughout the body. It appears that hyperimmunization by intravenous injection has not been practiced in producing anti-rinderpest serum. The plain advantages of the intravenous injection in the production of anti-hog-cholera serum would seem to indicate the employment of that method in producing anti-rinderpest serum.

In order to obtain immunes of proper weight and condition for hyperimmunization it has been the practice of this Bureau to feed and bring to proper size the pigs which have come through serum tests in good condition. In the serum tests these pigs receive subcutaneously 15, 20 or 25 c.c. each of serum and 2 c.c. each of virus. They may show during the test a temperature reaction with some loss of appetite, but in most cases they show no visible symptoms and no temperature reaction. These serum-test pigs weigh from fifty to eighty pounds when released from the tests and from one hundred and fifty to two hundred pounds when they are ready for hyperimmunizing, the interval between immunization and hyperimmunization being anywhere from three to six months. This plan of utilizing test pigs is followed by a number of commercial serum plants, which are thus assured of a supply of immune pigs of the proper weights for hyper-

immunization. If potent serum could be secured by hyperimmunizing immune hogs within a short interval after they are immunized, this practice of holding the test pigs could be done away with, thus effecting a saving of time and cost.

HYPERIMMUNIZATION AT THE NEGATIVE PHASE.

In carrying out the experiments, a number of susceptible pigs were first given simultaneous inoculations of serum and virus and were later hyperimmunized after intervals of 1 day, 2 days, 5 days, 7 days, 9 days, 10 days, and 3, 4, 5, 6, 7 and 8 weeks, respectively. At the 1 day, 2 day and 5 day intervals the pigs were hyperimmunized with 5 c.c. of virus per pound; at the 7 day, 9 day, and 10 day intervals one pig was given the regular hyperimmunizing injection of 5 c.c. of virus per pound and another pig was given 2.5 c.c. of virus per pound, or one-half of the regular hyperimmunizing injection; while at the longer intervals 1 pig was given 5 c.c. of virus per pound. These pigs, which may be termed "short-interval immunes," weighed from 95 to 205 pounds at the time of hyperimmunization.

The same viruses which were used for the hyperimmunization of the short-interval immunes were also, at the same time, used for the hyperimmunization of "regular immunes," that is, pigs which had been through serum tests and had thus received the simultaneous treatment when they weighed from 40 to 65 pounds. They showed no symptoms of illness following this treatment and were not again exposed to disease until virus was administered for hyperimmunization. At the time of hyperimmunization these regular immunes weighed from 163 to 210 pounds and were therefore approximately of the same weight as the short-interval immunes. The interval between the immunization and the hyperimmunization of the regular immunes was from three to six months. These hogs were hyperimmunized in order that we might have a control on the antigenic properties of each of the lots of virus used in the hyperimmunization of the short-interval immunes. The regular immunes were hyperimmunized and bled on the same dates as the corresponding short-interval immunes and the serums thus obtained were tested for potency in the same way as those obtained from the short-interval immunes. The records of all of the short-interval and of the regular immunes from which serums were obtained are shown in Table 1.

TABLE 1.

SHORT-INTERVAL AND REGULAR IMMUNES FROM WHICH SERUMS WERE OBTAINED.

Hog	*Record of Immunization*		Interval Between Immunization and Hyperimmunization	*Record of Hyperimmunization*		
	Serum Dose (c.c.)	Virus Dose (c.c.)		Weight When Hyperimmunized (lbs.)	Dose Virus per Pound Weight of Immune (c.c.)	Total Amount Virus Injected (c.c.)
3374	60	2	1 day	145	5	725
3378	60	2	2 days	170	5	850
3404	†	2	‡3 months	230	5	1150
4794	60	2	5 days	205	5	1025
4845	†	2	‡3 months	180	5	900
3291	40	2	7 days	115	5	575
3294	40	2	7 days	95	2.5	237.5
4859	†	2	‡3 months	210	5	1050
3295	40	2	9 days	99	5	495
3293	40	2	9 days	109	2.5	272.5
4785	†	2	‡3 months	192	5	960
3290	40	2	10 days	127	5	635
3292	40	2	10 days	119	2.5	297.5
4787	†	2	‡3 months	207	5	1035
3589	40	2	3 weeks	150	5	750
3603	†	2	‡3 months	182	5	910
3586	40	2	4 weeks	127	5	635
3956	†	2	‡3 months	218	5	1090
3584	40	2	5 weeks	153	5	765
3615	†	2	‡3 months	180	5	900
3587	40	2	6 weeks	156	5	780
3616	†	2	‡3 months	195	5	975
3588	40	2	7 weeks	167	5	835
3617	†	2	‡3 months	192	5	960
3590	40	2	8 weeks	158	5	790
3630	†	2	‡3 months	190	5	950

† These hogs were immunized in serum tests when they were shoats weighing from 40 to 65 pounds and received at that time from 15 to 25 c.c. of serum with 2 c.c. of virus.

‡ The interval between immunization and hyperimmunization of these hogs varied from 3 to 6 months; the exact time that elapsed in each case is not recorded.

Two weeks after hyperimmunization, all of the hyperimmunized hogs, both the regular and the short-interval immunes, were bled and serum was prepared from each in the usual manner by defibrinating the blood and adding 0.5% of phenol.

These serums were tested on susceptible pigs, a serum from a regular immune being compared in each instance with the serum from one of the short-interval immunes. In carrying out the tests of the different serums susceptible pigs weighing from 35 to 85 pounds each were used. Six pigs were used in testing each

serum, two pigs received 5 c.c. each of serum, subcutaneously, two received 10 c.c. each, and two received 15 c.c. each. Each pig at the same time received a subcutaneous injection of 2 c.c. of virus in the groin opposite to that in which the serum was injected. A certain number of pigs were injected with the virus alone to serve as controls. In several instances two or more serums were tested at a time, so as to reduce the number of virus controls.

Tables 2 and 3 afford a comparison between the serums obtained from the short-interval immunes and those obtained from the regular (long-interval) immunes.

TABLE 2.

PROTECTION AFFORDED BY SERUMS FROM SHORT-INTERVAL IMMUNES.

Hog No.	Interval Between Immunization and Hyperimmunization	*Protection Afforded by Serum Against 2 c.c. Virus.		
		5 c.c. Serum	10 c.c. Serum	15 c.c. Serum
3374	1 day	None	None	None
3378	2 days	None	None	None
4794	5 days	None	None	None
†3294	7 days	None	None	‡Partial
3291	7 days	None	‡Partial	‡Partial
†3293	9 days	None	None	None
3295	9 days	None	None	Complete
†3292	10 days	None	None	None
3290	10 days	None	None	None
3589	3 weeks	None	None	Complete
3586	4 weeks	Partial	Partial	Complete
3584	5 weeks	Complete	Complete	Complete
3587	6 weeks	None	None	None
3588	7 weeks	Complete	Complete	Complete
3590	8 weeks	None	Complete	Complete

* Complete protection means that neither of the test pigs showed any visible symptoms of sickness; partial protection, that one or both of the test pigs became sick but recovered; no protection, that one or both of the test pigs died from hog cholera.

† These hogs were hyperimmunized with only 2.5 c.c. of virus per pound body weight.

‡ There was only slight loss of appetite in these pigs (see TABLE 4).

TABLE 3.

PROTECTION AFFORDED BY SERUMS FROM REGULAR (LONG-INTERVAL) IMMUNES.

Hog No.	Interval Between Immunization and Hyperimmunization	*Protection Afforded by Serum Against 2 c.c. virus.		
		5 c.c. Serum	10 c.c. Serum	15 c.c. Serum
3404	More than 3 mos.	Complete	Complete	Complete
4845	do.	Complete	Complete	Complete
4859	do.	Complete	Complete	Complete
4785	do.	None	Complete	Complete
4787	do.	Complete	Complete	Complete
3603	do.	Complete	Complete	Complete
3956	do.	Complete	Complete	Complete
3615	do.	Complete	Complete	Complete
3616	do.	Complete	Complete	Complete
3617	do.	Complete	Complete	Complete
3630	do.	None	Complete	Complete

* Complete protection means that neither of the test pigs showed any visible symptoms of sickness; partial protection, that one or both of the test pigs became sick but recovered; no protection, that one or both of the test pigs died from hog cholera.

The results shown in Tables 2 and 3 are very striking. Every one of the eleven regular long-interval immunes yielded a serum of good potency, while only one hog among the thirteen that were hyperimmunized within six weeks after simultaneous inoculation yielded a serum potent enough for use in practice. A closer examination of Tables 2 and 3, as well as of those which follow, shows that there was almost complete lack of potency in the serums from the hogs that were hyperimmunized within ten days after they were immunized. Of the nine hogs hyperimmunized during that period, three (Nos. 3294, 3293 and 3292) were given only half as much virus per pound of body weight as was given to the other hogs in this group and to the regular long-interval immunes. These three hogs are therefore excluded from consideration in the discussion of the results of serum tests.

The serums from the six hogs that received 5 c.c. of virus blood per pound within 10 days after immunization were tested on 36 susceptible pigs, six pigs for each serum (see Table 4). Of these test pigs 29, or 80.5%, died of hog cholera. There is an indication that some of these serums had a slight protective value, but in none of them was this evident in a degree comparable to that shown by the serums from the regular (long-interval) immunes.

Table 4.

TESTS OF SERUMS FROM HOGS HYPERIMMUNIZED WITHIN TEN DAYS OF IMMUNIZATION.

Serum Dose	Virus Dose	No. of Pigs Injected	Result
Serum from Hog 3374, Hyperimmunized 1 Day After Immunization.			
5 c.c.	2 c.c.	2	Both died of hog cholera.
10 c.c.	2 c.c.	2	do.
15 c.c.	2 c.c.	2	do.
Serum from Hog 3378, Hyperimmunized 2 Days After Immunization.			
5 c.c.	2 c.c.	2	Both died of hog cholera.
10 c.c.	2 c.c.	2	do.
15 c.c.	2 c.c.	2	do.
Serum from Hog 4794, Hyperimmunized 5 Days After Immunization.			
5 c.c.	2 c.c.	2	Both died of hog cholera.
10 c.c.	2 c.c.	2	do.
15 c.c.	2 c.c.	2	do.
* Serum from Hog 3294, Hyperimmunized 7 Days After Immunization.			
5 c.c.	2 c.c.	2	Both died of hog cholera.
10 c.c.	2 c.c.	2	1 died of hog cholera; 1 slight loss of appetite, recovered.
15 c.c.	2 c.c.	2	Both showed slight loss of appetite; otherwise well.
Serum from Hog 3291, Hyperimmunized 7 Days After Immunization.			
5 c.c.	2 c.c.	2	1 died of hog cholera; 1 sick, recovered.
10 c.c.	2 c.c.	2	Both showed slight loss of appetite; otherwise well.
15 c.c.	2 c.c.	2	do.
* Serum from Hog 3293, Hyperimmunized 9 Days After Immunization.			
5 c.c.	2 c.c.	2	Both died of hog cholera.
10 c.c.	2 c.c.	2	do.
15 c.c.	2 c.c.	2	1 died of hog cholera; 1 slightly sick; recovered.

* These serums were from hogs hyperimmunized with only 2.5 c.c. virus per pound of body weight.

Serum Dose	Virus Dose	No. of Pigs Injected	Result
Serum from Hog 3295, Hyperimmunized 9 Days After Immunization.			
5 c.c.	2 c.c.	2	Both died of hog cholera.
10 c.c.	2 c.c.	2	do.
15 c.c.	2 c.c.	2	Both remained well.
* Serum from Hog 3292, Hyperimmunized 10 Days After Immunization.			
5 c.c.	2 c.c.	2	Both died of hog cholera.
10 c.c.	2 c.c.	2	do.
15 c.c.	2 c.c.	2	1 died of hog cholera; 1 sick but recovered.
Serum from Hog 3290, Hyperimmunized 10 Days After Immunization.			
5 c.c.	2 c.c.	2	Both died of hog cholera.
10 c.c.	2 c.c.	2	do.
15 c.c.	2 c.c.	2	do.

* These serums were from hogs hyperimmunized with only 2.5 c.c. virus per pound of body weight.

The serums obtained from the hogs that were hyperimmunized from three to six weeks after immunization (see Table 5) were somewhat more potent than those from the preceding group of pigs, yet they were, on the whole, distinctly inferior to the serums from the regular immunes. Of 24 pigs used to test these serums 5, or 20.8%, died of hog cholera, in spite of the fact that some had received the larger doses of serum (10 c.c. to 15 c.c.).

The serums from the pigs that were hyperimmunized 7 and 8 weeks respectively, after immunization (see Table 5) appeared to be of good potency, as only one test pig out of 12 (8.3%) died and that one received the smallest serum dose.

TABLE 5.

TESTS OF SERUMS FROM HOGS HYPERIMMUNIZED FROM THREE TO EIGHT WEEKS AFTER IMMUNIZATION.

Serum Dose	Virus Dose	No. of Pigs Injected	Result
Serum from Hog 3589, Hyperimmunized 3 Weeks After Immunization.			
5 c.c.	2 c.c.	2	1 died of hog cholera; 1 sick, recovered.
10 c.c.	2 c.c.	2	1 died of hog cholera; 1 remained well.
15 c.c.	2 c.c.	2	*Both remained well.
Serum from Hog 3586, Hyperimmunized 4 Weeks After Immunization.			
5 c.c.	2 c.c.	2	Both slightly sick; recovered.
10 c.c.	2 c.c.	2	1 remained well; 1 sick, recovered.
15 c.c.	2 c.c.	2	Both remained well.
Serum from Hog 3584, Hyperimmunized 5 Weeks After Immunization.			
5 c.c.	2 c.c.	2	Both remained well.
10 c.c.	2 c.c.	2	do.
15 c.c.	2 c.c.	2	do.
Serum from Hog 4845 (Control on Short-Interval Hyperimmune 4794).			
5 c.c.	2 c.c.	2	1 died of hog cholera; 1 very sick, survived in unthrifty condition.
10 c.c.	2 c.c.	2	1 died of hog cholera; 1 very sick, survived in unthrifty condition.
15 c.c.	2 c.c.	2	1 died of hog cholera; 1 remained well.
Serum from Hog 3588, Hyperimmunized 7 Weeks After Immunization.			
5 c.c.	2 c.c.	2	Both remained well.
10 c.c.	2 c.c.	2	do.
15 c.c.	2 c.c.	2	do.
Serum from Hog 3590, Hyperimmunized 8 Weeks After Immunization.			
5 c.c.	2 c.c.	2	1 died of hog cholera; 1 remained well.
10 c.c.	2 c.c.	2	Both remained well.
15 c.c.	2 c.c.	2	do.

* "Remained well" means that the pigs showed no visible symptoms of sickness; in some instances pigs so reported showed a temperature reaction.

Serums were obtained from eleven regular (long-interval) immunes and these were tested in groups along with the serums from the short-interval immunes, the same virus being used for the test pigs in both groups. A total of 66 test pigs were used for the regular immune serums and two of these (3.3%) died during the tests. The two which died each received only the smallest dose of serum. (See Table 6.)

TABLE 6.

TEST OF SERUMS FROM HOGS HYPERIMMUNIZED FROM THREE TO SIX MONTHS AFTER IMMUNIZATION.

Serum Dose	Virus Dose	No. of Pigs Treated	Result
Serum from Hog 3404 (Control on Short-Interval Hyperimmune 3378).			
5 c.c.	2 c.c.	2	Both remained well.
10 c.c.	2 c.c.	2	do.
15 c.c.	2 c.c.	2	do.
Serum from Hog 4845 (Control on Short-Interval Hyperimmune 4794).			
5 c.c.	2 c.c.	2	Both remained well.
10 c.c.	2 c.c.	2	do.
15 c.c.	2 c.c.	2	do.
Serum from Hog 4859 (Control on Short-Interval Hyperimmune 3291).			
5 c.c.	2 c.c.	2	Both remained well.
10 c.c.	2 c.c.	2	do.
15 c.c.	2 c.c.	2	do.
Serum from Hog 4785 (Control on Short-Interval Hyperimmune 3295).			
5 c.c.	2 c.c.	2	1 died of hog cholera; 1 slightly sick, recovered.
10 c.c.	2 c.c.	2	Both remained well.
15 c.c.	2 c.c.	2	do.
Serum from Hog 4787 (Control on Short-Interval Hyperimmune 3290).			
5 c.c.	2 c.c.	2	Both remained well.
10 c.c.	2 c.c.	2	do.
15 c.c.	2 c.c.	2	do.
Serum from Hog 3603 (Control on Short-Interval Hyperimmune 3589).			
5 c.c.	2 c.c.	2	Both remained well.
10 c.c.	2 c.c.	2	do.
15 c.c.	2 c.c.	2	do,

Serum from Hog 3956 (Control on Short-Interval Hyperimmune 3586).

Serum Dose	Virus Dose	No. of Pigs Treated	Result
5 c.c.	2 c.c.	2	Both remained well.
10 c.c.	2 c.c.	2	do.
15 c.c.	2 c.c.	2	do.

Serum from Hog 3615 (Control on Short-Interval Hyperimmune 3584).

5 c.c.	2 c.c.	2	Both remained well.
10 c.c.	2 c.c.	2	do.
15 c.c.	2 c.c.	2	do.

Serum from Hog 3616 (Control on Short-Interval Hyperimmune 3587).

5 c.c.	2 c.c.	2	Both remained well.
10 c.c.	2 c.c.	2	do.
15 c.c.	2 c.c.	2	do.

Serum from Hog 3617 (Control on Short-Interval Hyperimmune 3588).

5 c.c.	2 c.c.	2	Both remained well.
10 c.c.	2 c.c.	2	do.
15 c.c.	2 c.c.	2	do.

Serum from Hog 3630 (Control on Short-Interval Hyperimmune 3590).

5 c.c.	2 c.c.	2	1 died of hog cholera; 1 sick, but recovered.
10 c.c.	2 c.c.	2	Both remained well.
15 c.c.	2 c.c.	2	do.

As a control on the virus used in the tests, several susceptible pigs were always inoculated with the same virus in the same dose as that used for the test pigs. Table 7 gives the results of these injections. It will be noted that all of these controls developed hog cholera. A large proportion were killed in order that their blood might be used in other experiments. The early slaughter of these controls prevents a determination of the actual death rate that would have occurred had the pigs not been killed. The fact that they were utilized for virus production shows that they developed acute and rapid disease with sustained high temperatures and past experience leads us to believe that at least 95% would eventually have succumbed had not the course of the disease been interfered with. As may be seen from the table, all

of the controls exhibited distinct lesions of hog cholera at autopsy.

TABLE 7.

VIRUS CONTROLS ON TESTS OF SERUMS FROM SHORT-INTERVAL AND LONG-INTERVAL IMMUNES.

Pig No.	Wt. (lbs.)	Virus Dose (c.c.)	Killed for Virus	Autopsy Findings.
Virus Used in Testing Serums from Hogs 3374, 3378, 3404, 4794 and 4845.				
1902	60	2	6th day	Well marked lesions of hog cholera.
1903	55	2	6th day	do.
1904	55	2	6th day	do.
1905	55	2	6th day	do.
Virus Used in Testing Serums from Hogs 3291, 3294 and 4859.				
1569	35	2	7th day	Well-marked lesions of hog cholera.
1570	43	2	7th day	do.
1571	55	2	7th day	do.
1572	56	2	7th day	do.
Virus Used in Testing Serums from Hogs 3295, 3293 and 4785.				
1648	47	2	7th day	Well-marked lesions of hog cholera.
1649	58	2	7th day	do.
1650	40	2	7th day	do.
Virus Used in Testing Serums from Hogs 3290, 3292 and 4787.				
1811	45	2	9th day	Well-marked lesions of hog cholera.
1812	45	2	9th day	do.
1813	80	2	7th day	do.
1814	55	2	7th day	do.
Virus Used in Testing Serums from Hogs 3589 and 3603.				
2429	45	2	8th day	Well-marked lesions of hog cholera.
2430	60	2	17th day*	Extensive lesions of hog cholera.
Virus Used in Testing Serums from Hogs 3586 and 3956.				
2795	60	2	20th day†	Extensive lesions of hog cholera.
2797	50	2	13th day†	Well-marked lesions of hog cholera.

Virus Used in Testing Serums from Hogs 3584, 3615, 3588 and 3617.

Pig No.	Wt. (lbs.)	Virus Dose (c.c.)	Killed for Virus	Autopsy Findings.
3050	40	2	8th day	Slight lesions of hog cholera.
3051	60	2	8th day	Well-marked lesions of hog cholera.
3052	60	2	13th day†	Extensive lesions of hog cholera.
				Virus Used in Testing Serums from Hogs 3587 and 3616.
2825	50	2	7th day	Well-marked lesions of hog cholera.
2826	50	2	8th day	do.
2827	50	2	8th day	do.
				Virus Used in Testing Serums from Hogs 3590 and 3630.
2845	70	2	28th day*	Slight lesions of hog cholera.
2846	70	2	10th day	do.

* Killed in moribund condition.
† Died.

From the above results, it is evident that in the case of hog cholera, hyperimmunization shortly after immunization, or during the so-called "negative phase," is undesirable because it results in the production of very inferior serum. It appears that, as a rule, and within certain limits, the longer the interval that elapses between immunization, on the one hand, and hyperimmunization, on the other, the more potent the serum. These results have been surprising in view of the success of Holmes* in producing a highly potent anti-rinderpest serum by hyperimmunization at the "negative phase" within 10 days after immunization.

In this connection it is interesting to recall the findings of Park and Zingher† in their work on the active immunization of children against diphtheria by injection of mixtures of toxin and antitoxin. They found that children who were naturally immune responded promptly and strongly to the immunizing dose by the production of antitoxin, whereas less than 25 per cent of those who possessed no natural immunity responded within four weeks to the same injection. In our own work we have been dealing

* L. c.

† Park, W. H., and Zingher, A. Active Immunization in Diphtheria and Treatment by Toxin-Antitoxin. Jour. Amer. Med. Asso., Vol. 63, No. 10, p. 859, Sept. 5, 1914, and Active Immunization with Diphtheria Toxin-Antitoxin. Jour. Amer. Med. Asso., Vol. 65, No. 26, p. 2216, Dec. 25, 1915.

with a living virus along with what may be assumed to be a toxin that exists in the blood of sick pigs and we have used no antitoxin in the operation of hyperimmunizing; therefore our experiments cannot be regarded as strictly analogous to those of Park and Zingher. However, the results we have obtained are very similar, for we find in hog cholera that susceptibility to immunizing response is a very different thing from susceptibility to disease and we might almost conclude that they are in a degree, in inverse proportion, the greater the susceptibility to infection the less the susceptibility to immunizing response and vice versa.

We have been unable to notice any marked physical signs of "negative phase" following the simultaneous inoculation of susceptible pigs, provided, of course, a sufficient dose of serum is used. In some individuals there may be a transient rise of temperature a few days after inoculation, but nothing more if the work is properly done. Defibrinated blood from a pig affected with a virulent strain of hog cholera, such as was used in our experiments, is usually fatal to susceptible pigs when given in doses of 1/100 c.c. or even less. The records given above show that we have been able regularly to administer from 50,000 to 100,000 times that dose to pigs within ten days after simultaneous inoculation without producing any marked reaction. To our minds, this seems to prove that there is no "negative phase" or stage of increased susceptibility to disease, following simultaneous inoculation against hog cholera, and that the state of increased susceptibility to immunizing response is not fully developed, as a rule, until the lapse of seven weeks or more after simultaneous inoculation.

HYPERIMMUNIZATION WITH DILUTED AND LAKED VIRUS BLOOD.

As has been stated previously, Holmes* reported that rinderpest virus diluted with hypotonic citrate solution was more satisfactory for hyperimmunization than the undiluted defibrinated blood. He believed this was due in part to the freeing of virus from the red blood cells through hemolysis and in part to the more rapid absorption of the diluted virus, the hyperimmunizing dose in anti-rinderpest serum production being given simultaneously.

In anti-hog-cholera serum production the hyperimmunizing dose is given intravenously, hence rapid dissemination, even of

* L. c.

the undiluted defibrinated blood is assured, but since there was a possibility that through hemolysis a greater amount of the antigen would be made immediately available, we have hyperimmunized several immunes with diluted virus in order to compare serum produced in that way with serum secured by the common practice of injecting the undiluted defibrinated blood.

1. *Virus blood diluted with citrate solution.* Blood was drawn from pigs sick of hog cholera directly into a solution containing 0.5 per cent of potassium citrate and in sufficient amount to give a mixture consisting of equal parts of blood and citrate solution. A portion of the blood from the pigs which furnished this virus was drawn into separate containers and defibrinated without any addition whatever. These two lots of virus, one consisting of the diluted whole blood and the other of the undiluted defibrinated blood, were used to hyperimmunize five regular, "long-interval" immunes. All hyperimmunizing injections were made intravenously, as follows:

Immune hog 4779 was hyperimmunized with 5 c.c. per pound of fresh citrated virus blood.

Immune hog 4781 was hyperimmunized with 10 c.c. per pound of fresh citrated virus blood.

Immune hog 3298 was hyperimmunized with 5 c.c. per pound of citrated virus blood that had been held in a cool place for 24 hours.

Immune hog 4786 was hyperimmunized with 5 c.c. per pound of citrated virus blood that had been held in a cool place for 3 days.

Immune hog 4782 was hyperimmunized with 5 c.c. per pound of undiluted defibrinated virus blood.

The citrated virus blood used to hyperimmunize hogs 3298 and 4786 was held for a time after preparation to determine whether standing and, therefore, more complete hemolysis, would increase its antigenic properties.

Fourteen days after hyperimmunization, each of the above hyperimmunes was bled and serum prepared from each in the usual manner by defibrination of the blood and the addition of 0.5 per cent phenol. The five different serum lots were tested on susceptible pigs in doses of 5 c.c., 10 c.c., and 15 c.c., against 2 c.c. of virus blood. Control pigs were injected with the virus blood alone.

The results of the serum tests are shown in *Table 8.*

Table 8.

TESTS OF SERUMS FROM HOGS HYPERIMMUNIZED WITH CITRATED VIRUS BLOOD.

Serum Dose	Virus Dose	No. of Pigs Treated	Result.
Serum from Hog 4779, Hyperimmunized with Fresh Citrated Virus Blood.			
5 c.c.	2 c.c.	2	Both showed slight loss of appetite, otherwise well.
10 c.c.	2 c.c.	2	do.
15 c.c.	2 c.c.	2	do.
Serum from Hog 4781, Hyperimmunized with Fresh Citrated Virus Blood.			
5 c.c.	2 c.c.	2	1 remained well; other slightly sick, recovered.
10 c.c.	2 c.c.	2	Both slightly sick, recovered.
15 c.c.	2 c.c.	2	Both remained well.
Serum from Hog 3298, Hyperimmunized with Citrated Virus Blood Held for 24 Hours.			
5 c.c.	2 c.c.	2	Both died of hog cholera.
10 c.c.	2 c.c.	2	Both remained well.
15 c.c.	2 c.c.	2	1 remained well; other showed only slight loss of appetite.
Serum from Hog 4786, Hyperimmunized with Citrated Virus Blood Held for 3 Days.			
5 c.c.	2 c.c.	2	1 died of hog cholera; other showed only slight loss of appetite.
10 c.c.	2 c.c.	2	Both showed only slight loss of appetite.
15 c.c.	2 c.c.	2	1 died of hog cholera; other showed only slight loss of appetite.
Serum from Hog 4782, Hyperimmunized with Undiluted Defibrinated Virus Blood.			
5 c.c.	2 c.c.	2	Both remained well.
10 c.c.	2 c.c.	2	do.
15 c.c.	2 c.c.	2	do.

TABLE 9.

VIRUS CONTROLS ON TESTS OF SERUMS FROM HOGS HYPERIMMUNIZED WITH CITRATED VIRUS BLOOD.

Pig No.	Wt. (lbs.)	Virus Dose (c.c.)	Killed for Virus	Autopsy Findings.
1569	35	2	7th day	Well-marked lesions of hog cholera.
1570	43	2	7th day	do.
1571	55	2	7th day	do.
1572	56	2	7th day	do.

Of 24 pigs used to test the potency of the serums from the immunes that received the citrated virus blood 18, or 75%, became sick and 4, or 16⅔%, died. All of the six pigs (100%) that were given serum from immunes hyperimmunized with undiluted defibrinated blood remained well.

All of the pigs injected with virus alone as controls on the serum test (see Table 9) contracted acute hog cholera and were killed on the 7th day after inoculation in order that their blood might be used in other experiments.

Three of the immunes that were given the citrated virus blood received 5 c.c. per pound and one received 10 c.c. per pound, so that, of actual virus blood three received 2.5 c.c. per pound and one 5 c.c. per pound. From the tests it will be seen that the serum from the immune that was given the largest dose of citrated virus blood was no better than that from the immunes which received only half as much. The serum from the immune that was hyperimmunized with the undiluted defibrinated virus blood was distinctly more potent than those from the immunes hyperimmunized with the citrated virus blood.

2. *Virus blood diluted with water.* If the antigenic properties of virus blood could be increased by dissolution of the red blood cells it would be reasonable to expect that the degree of increase would depend upon the extent of the dissolution. We have endeavored to obtain a more complete hemolysis by drawing the virus blood directly into distilled water and by mixing defibrinted virus blood with distilled water. The experiment was carried out as follows:

Blood was drawn from four sick pigs into sterile bottles containing sterile, distilled water. Two hundred cubic centimeters of blood was drawn from each pig into an equal amount of water, the blood of each pig being caught in a separate bottle. The re-

maining blood from each of the virus pigs was then collected in separate bottles, defibrinated, strained through sterile gauze, and mixed. The bottles containing the diluted blood and the mixed defibrinated blood were placed in a cooler and allowed to remain for twenty-four hours.

At the end of three hours the bottles containing the diluted blood were shaken sufficiently to loosen the clots from the sides of the bottles. At the end of twenty-four hours the serum had separated well in these bottles and the clots had contracted and were floating at the surface. The bottles were then shaken in order to break up the clots. The contents of the four bottles were next strained through four thicknesses of sterile gauze into the same bottle and thoroughly mixed. Sodium chloride in the proportion of 0.4 per cent was added to produce a normal solution and the diluted blood was then used for the hyperimmunization of an immune hog.

The defibrinated blood which had been collected at the same time from the same sick pigs was divided into two parts, one part being diluted with an equal volume of sterile distilled water. After hemolysis, sodium chloride was added in the proportion of 0.4 per cent. This diluted, defibrinated virus blood was likewise used for the hyperimmunization of a second immune hog. A third immune was hyperimmunized with the remaining portion of defibrinated virus blood, undiluted.

The three hogs which were hyperimmunized in this experiment were as follows:

Hog 3569 was hyperimmunized with 5 c.c. per pound of whole virus blood plus an equal volume of distilled water with 0.4% of sodium chloride added.

Hog 3570 was hyperimmunized with 5 c.c. per pound of defibrinted virus blood plus an equal volume of distilled water with 0.4% sodium chloride added.

Hog 3568 was hyperimmunized with 5 c.c. per pound of undiluted, defibrinated virus blood.

Fourteen days after hyperimmunization, blood was drawn from each of the above hyperimmunes and serum prepared from each in the usual manner by defibrination of the blood and the addition of 0.5% phenol. The three lots of serum thus obtained were tested on susceptible pigs in doses of 5 c.c., 10 c.c., and 15 c.c., against 2 c.c. of virus blood. For the purpose of control, two pigs were injected with the virus blood alone. The results of these serum tests are shown in Table 10.

TABLE 10.

TESTS OF SERUMS FROM HOGS HYPERIMMUNIZED WITH VIRUS BLOOD DILUTED WITH WATER.

Serum Dose	Virus Dose	No. of Pigs Treated	Result.
Serum from Hog 3569, Hyperimmunized with Whole Virus Blood Diluted with Distilled Water.			
5 c.c.	2 c.c.	2	1 sick but recovered; other showed only slight loss of appetite.
10 c.c.	2 c.c.	2	Both showed only slight loss of appetite.
15 c.c.	2 c.c.	2	1 sick but recovered; other remained well.
Serum from Hog 3570, Hyperimmunized with Defibrinated Virus Blood Diluted with Distilled Water.			
5 c.c.	2 c.c.	2	Both died of hog cholera.
10 c.c.	2 c.c.	2	1 died of hog cholera; other sick but recovered.
15 c.c.	2 c.c.	2	Both slightly sick but recovered.
Serum from Hog 3568, Hyperimmunized with Undiluted, Defibrinated Blood.			
5 c.c.	2 c.c.	2	Both remained well.
10 c.c.	2 c.c.	2	do.
15 c.c.	2 c.c.	2	do.
Virus Controls.			
None	2 c.c.	1	Killed on 9th day when moribund; well-marked lesions of hog cholera.
None	2 c.c.	1	do.

It will be seen that the serum from hog 3568, hyperimmunized with the undiluted, defibrinated blood, possessed a high degree of potency, as all of the pigs receiving this serum were completely protected even by the smallest doses. On the other hand, the serums from hogs 3570 and 3569, hyperimmunized with the diluted, defibrinated blood and the diluted whole blood, were distinctly lower in potency (Table 10). As hog 3568 received twice as much actual virus blood as hogs 3570 and 3569, the results of the serum tests cannot be taken as an indication that dilution of the blood and hemolysis reduced the antigenic power of the virus, but, rather, that those changes in condition did not enhance the antigenic power sufficiently to compensate for the reduction in the total amount of virus injected.

The preceding experiments indicate that neither dilution nor hemolysis increases the antigenic properties of hog cholera virus blood to any material degree when injections are made intravenously.

SUMMARY.

The methods employed to hyperimmunize hogs against hog cholera are discussed and experimental evidence is presented to show that hogs which are hyperimmunized within a short interval after simultaneous immunization do not produce serum of satisfactory potency. It is also shown that as a rule ability of the hyperimmunized hog to yield a potent serum increases, within certain limits, as the interval between immunization and hyperimmunization increases. The simultaneous inoculation of nonimmune pigs with serum and virus was followed almost immediately by a remarkably firm immunity which enabled them to withstand enormous doses of virus blood administered intravenously within a day or two after simultaneous inoculation. Hyperimmunization with virus blood diluted wiht 0.5% citrate solution and with distilled water is described and experiments are presented which indicate that dilution and hemolysis do not materially increase the antigenic properties of the virus blood.

CONCLUSIONS.

1. In the production of anti-hog-cholera serum an interval of not less than seven weeks should be allowed to elapse between immunization and hyperimmunization. It is believed that the most uniformly satisfactory results will be obtained by allowing at least three months to elapse between immunization and hyperimmunization.

2. The ability of immune hogs to respond to hyperimmunization to the desired degree, once acquired, remains unimpaired for at least a year.

3. There is no evidence of a "negative phase" or state of hypersusceptibility to hog cholera folowing simultaneous inoculation.

4. Dilution and hemolysis of hog cholera virus blood do not materially increase its antigenic power.

Dr. L. F. Koonce of Raleigh, N. C., is recovering from an attack of "flu" contracted while attending a meat and milk inspectors' meeting in New York City recently.

THE CONTROL OF SOME OF THE IMPORTANT INFECTIOUS DISEASES IN THE CONSERVATION OF OUR LIVE STOCK.*

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At no time in the history of our country has the veterinary profession been confronted with more serious problems than at present. All conditions, especially those affecting the food supply, have changed since the outbreak of the present great world conflict, and since our participation in the war the conservation of the food supply became the keynote of the leaders.

For many years to come after the conclusion of peace the depletion of live stock in all countries in Europe will continue to make them dependent upon outside sources for their meat food. From the present outlook the United States and Argentine will be especially called upon to make up the deficiency created in European countries. The great demand for foreign shipment resulting in a marked increase in value of all live stock brought about a natural tendency among the breeders and stockmen to immediately realize the profits and disregard to some extent the future as far as the supply of live stock is concerned.

For this and many other reasons it is obvious that it is the duty of the veterinarians to enlighten stock owners of the necessity to maintain their breeding stock at a maximum and to conserve the health and quality of the animals. All means and precautions should be taken to guard against losses from diseases and the authorities should conscientiously enforce all measures by which it is possible to guard against the spread of disease.

In this regard the occurrence of sporadic diseases among the live stock is of minor importance when compared with those scourges which are responsible for the death of thousands—yes, hundreds of thousands—of animals.

There should be no slacking on the veterinarian's part and unless he realizes that it is his duty to assist with all his ability in the conservation of live stock he fails to do his bit.

In the different localities of our country various infectious and contagious diseases are prevalent. Some sections suffer year

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after year from losses from a certain disease which is unknown in other sections. This is primarily dependent on the geographic and climatic conditions, as well as on the adaptation of certain localities for the breeding of certain live stock. Among the diseases which are most widely spread throughout the United States and which on account of its insidious nature is the most difficult to control is tuberculosis. Unfortunately there has never been a definite plan formulated which would encourage an early control and eradication of this disease and in view of the character of the disease and complexity of the control of tuberculosis it would not be possible to discuss this affection within the scope of this short treatise. Furthermore, it would not be possible to take up many of the other diseases within the time allotted to me and it will be probably most advantageous to confine the discussion to some of the diseases which are especially prevalent in your locality and which might be responsible for great losses among the various species of animals.

ANTHRAX.

More recently anthrax has appeared in various parts of the country in which heretofore it was unknown. Several of the New England States have become new centers of the infection and in most instances the introduction of the disease was traced to tanneries which on account of the shortage of hides were compelled to import them from foreign countries.

Anthrax is known to be insidious in certain parts of the country in which the disease occurs annualy among the live stock. Such infected localities are known as anthrax districts, our Southern States being especially heavily contaminated. Besides the disease is also prevalent in some of the Northern and Western States, but the area there is more limited. In the Eastern part the origin of the disease may be in most cases traced to polluted streams from tanneries which, inundating the land, have deposited the virus of the disease on to the low lands. From here animals carry the disease to more distant parts of these localities and the infection becomes in some cases permanently established.

The tenacity of the anthrax spore which may persist in the soil for many years without suffering in its vitality renders the elimination of the infection from infected localities very difficult. Besides the infection may establish itself in suitable soil permanently in a way that the anthrax spores at proper temperature and moisture conditions will germinate and again reproduce

spores. Thus the propagation and reinfection of the soil may take place without a re-contamination of the soil from outside sources. Under such conditions one can readily see the difficult problem of eliminating the infection from the soil.

The persistent cultivation of the land, drainage of areas subject to inundation may reduce the infection in such localities. However, the danger of the reappearance of the disease must be always given due cognizance in view of the resistance of the anthrax spore.

In the control of this disease, as in all other infectious diseases, it is primarily essential to make an early, definite, positive diagnosis of the disease. The post-mortem characteristics which in some cases are definite may be far from pathognomonic in every instance. The clinical manifestations in the form of the tarry consistence of the blood, the enlarged spleen, gelatinous infiltration of the subcutis, the bloody discharges from the natural openings, etc., while in many cases present, are not manifested in every case. This applies especially to the peracute cases in which very few of the characteristic lesions are indicated.

During life, unless our suspicion is aroused to the presence of the disease from the history, the symptomatology of anthrax is not absolutely characteristic. Therefore, we are dependent to make the diagnosis positive, especially in more obscure cases, by subjecting the blood to miscroscopical examination and if necessary to test inoculations. As soon as the disease is being diagnosed the opening of the carcasses should not be undertaken since such procedure induces the formation of spores from the germs contained in the body of the carcasses, which naturally would bring about a permanent infection of the land.

It should be realized that spores do not form in the carcass of the animal unless it is opened and that the vegetative form of the organism is readily destroyed by the putrefaction of the carcass. In case the disease is suspected and a definite diagnosis cannot be established it is advisable to take a few drops of blood on to a piece of glass from a carcass as soon after death as possible, dry the same in the air and cover with another piece of glass. This should be properly wrapped and forwarded for diagnosing purposes. Such material affords sufficient quantity for microscopical examination and also if necessary for test inoculations. As soon as the diagnosis of anthrax has been made the veterinarian should look for the source of infection. The

animals should be kept from the source of infection, the carcasses should be burned and if such is impossible they should be buried at least seven feet deep and covered with quicklime. The premises should be thoroughly disinfected.

If the disease occurred in a dairy, quarantine measures should be instituted prohibiting the sale of milk for at least ten days from the occurrence of the last case. On premises where the disease has appeared, all animals, including horses and hogs, should be subjected to vaccination. The simultaneous method is best adapted in such instances, which consists of the injection of an anti-anthrax serum on one side of the animal and the spore vaccine on the other side. Temperature readings should be taken on all animals, and those showing rise of temperature over 103°, with the exception of hogs, should be given the serum alone. Those animals showing signs of the disease should be given curative doses of the serum which has proven to save a large proportion of animals.

In order to safeguard the stock in the infected locality and to prevent further outbreaks, it is further advisable to vaccinate the animals around the infected premises, and in such instances, also, either the simultaneous method or the double vaccination may be employed. Vaccination of the stock should be undertaken for several years, even if no further signs of the existence of the disease have occurred, since it is a well-known fact that the disease may again develop even after a period of several years, in which case a reinfection of the soil may result.

As far as the contamination of the streams from the tanneries is concerned, the Federal authorities are aiming to promulgate measures by which the importation of hides from anthrax carcasses might be prevented. Up to date, however, there are no satisfactory means by which this may be accomplished. Some of the more up-to-date tanneries, in order to prevent the contamination of the streams from the drainage water of the tanneries, instituted settling tanks in connection with the establishment, which, however, have not proved to entirely eliminate the infection, although by passing the drainage water through a series of settling tanks and then spreading the solid material over filter beds the infection may be reduced considerably. Chlorinating of the drainage water has also been attempted and proved highly satisfactory. Such practice, however, proved quite expensive and to my knowledge has not yet been inangurated in any of the tanneries.

Thus, as long as tanneries will handle hides from anthrax carcasses they will be a constant source of infecting the lands lying along the streams into which the drainage from the tanneries flows and the sanitary authorities must direct their attention principally to controlling the disease as soon as it makes its appearance.

BLACKLEG.

Another disease in which the infective agent is present in the soil and which is responsible for great losses among the cattle in our country is blackleg. Although not as contagious in its nature as anthrax, nevertheless in so-called blackleg territories losses from this disease amount to considerable among the young stock.

The causative agent which is ever present in the soil may enter the body in various ways. The infection probably occurs most frequently through ingestion, although abrasions in the skin may also afford an entry for the germs. More recently Dr. Hadwen, Chief Pathologist of the Branch of Animal Industry of the Dominion of Canada, discussed with the writer certain observations which he made in connection with his studies on the life history of the hypoderma larvæ during which he observed that during the burrowing process through the skin the larvæ may carry the blackleg infection.

Once the organism becomes localized it exerts its pathogenic action upon the tissues surrounding the place of invasion. Here under favorable conditions the blackleg organism will propagate, eliminating the toxins, which causes a degeneration of the muscles and through the destruction of the nitrogenous matter gases are formed. The toxins are absorbed by the body fluids, causing the systemic disturbance and finally death.

It must be recognized that blackleg is a toxemia and that the blackleg organisms do not invade the general circulation but remain localized during the life of the animal. At the point of localization the pathological process continues, causing the characteristic lesions of the disease in the form of the crepitating swelling, gangrenous in its character.

In this connection blackleg is very similar to gas gangrene, which caused so many deaths among the wounded soldiers. It is a well-known fact that the Bacillus welchii, the causative agent of gas gangrene, and which has been the destructive disease of the armies at war, resembles morphologically, biologically and in its cultural characteristics very closely the bacillus of blackleg.

In fact, differentiation at times can be only accomplished by the most painstaking biological tests.

Bull and Pritchett of the Rockefeller Institute for Medical Research in their study of gas gangrene have established that this organism produces under certain conditions a very powerful toxin which is actually responsible for the serious results of the disease and deaths. These facts have likewise been established by the writer in his connection with the study of blackleg. The same claims as made by Bull and Pritchett, that under suitable conditions cultures of gas bacilli produce true toxins to which their pathogenic effects may be ascribed, may also be applied to the cultures of blackleg bacilli. They further maintain that there are produced at least two distinct toxins, one of which is hemolytic, while the other causes local edema and necrosis and probably also a more general toxic action. This we find to be also the result of the blackleg toxins. The hemolytic action on the blood is best shown by intravenous injection of Berkefeld filtrates of cultures which contain the meat. On the other hand, the local destructive effects may be readily produced by subcutaneous or intramuscular injections of such filtrates, such lesions then resembling closely those which occur in the actual disease of affected animals.

They further claim that repeated injections of filtrates in pigeons and rabbits result in a true active immunity, and the blood of immunized rabbits neutralizes the toxic actions of the filtrate not only in the test tube but also in the living animal with respect to the locally injurious actions, as well as the destruction of blood corpuscles. They have also found that the blood of rabbits which have received three injections of toxic filtrate from a given culture is capable of neutralizing not only that particular filtrate but the filtrate from four other cultures as well. These findings coincide with the action of blackleg filtrate as far as it has been studied and that we possess in this product true immunizing toxins which are responsible for the principal pathogenic effects in blackleg infection, and again it is noted that in order to produce such toxins it is essential to add *meat to the media,* otherwise the production of these specific toxins is inhibited.

These experimental findings constitute the fundamental knowledge on which the control of blackleg by the specific toxins is being attempted.

Up to the present time the most common method of vaccination which has been employed not only in the United States but also in other countries where blackleg is prevalent consisted of the injection of attenuated virus prepared in either pellet or powder form. The number of annual vaccinations with this product amount to many millions, and while the reports prove conclusively of value to the product as an immunizing agent, nevertheless the results are not uniformly satisfactory, as direct losses from vaccination are known to occur from time to time; and, furthermore, insufficient protection following vaccination is also of too common occurrence.

The shortcomings of the blackleg vaccine lie mainly in the fact that in its production the virulence and immunity producing properties cannot be accurately enough controlled and tested. It is true that the vaccine is weighed or measured, but it is impossible to establish the amount and activity of the virus which it contains.

Due to the shortcomings of the different methods of vaccination, investigators have sought to develop a product which would possess the greatest possible immunizing properties and also be safe and controllable from the time of its production until the administration into the animal. Japanese investigators in continuing the work to develop a germ-free filtrate as inaugurated by Foth produced from mass cultures a safe and effective product for blackleg immunization and at the present time the germ-free filtrate is used almost uniformly for vaccination purposes against blackleg in Japan.

The results of vaccination of animals with Blackleg Filtrate has proven beyond a doubt the effectiveness of this method. Out of one million animals vaccinated by this method less than 1/25 of 1% died of blackleg, which must be considered a very small percentage, since the fact must be recognized that most of the deaths occurred shortly after vaccination, that is, before immunity was fully established, and besides vaccination in most instances was undertaken in herds where the disease had already made its appearance.

It is natural in the production of Blackleg Filtrate the greatest care must be exercised in order to insure a potent product, that is, the filtrate must contain the active toxins of the blackleg germ. The toxins when injected into the animal produce an active immunity which will afford a protection lasting for about one year. Blackleg Filtrate being germ-free may be injected

safely into calves at any age without the slightest danger. Animals over two years old are seldom affected, especially if they have been vaccinated in their younger age, as the immunity produced will protect them through the ages of lesser susceptibility. The highest degree of immunity is produced by vaccination of animals at ages between six months and two years.

Animals vaccinated should not be exposed to the infection until the immunity has been established, that is, for a period of ten days, since during that period they are still susceptible, even hypersusceptible, to the infection. Aside from vaccination, other measures of control must also be inaugurated, special attention to be given to the destruction of the carcasses in order to prevent the re-impregnation of the soil with the infection.

HEMORRHAGIC SEPTICEMIA.

Hemorrhagic Septicemia is a collective name for those infectious diseases of different species of animals which are caused by the *Bacillus bipolaris septicus.* Not only does the causative agent primarily attack the animal and cause outbreaks with great losses but the germ is frequently secondarily responsible for losses among live stock. The disease may occur as an independent infection in cattle, sheep and hogs, whereas the organisms have been found as secondary invaders in hog cholera, equine influenza (shipping fever) and in canine distemper. Recently McGown attributes a destructive disease of sheep in Great Britain known as Braxy to a variety of this organism.

Hemorrhagic Septicemia or bipolar organisms are very widely distributed in nature. They are found in the soil, on various plants, in stagnant water and even on the normal mucous membranes of animals. Under such conditions they apparently live as saprophytes and under favorable environment they become virulent, causing outbreaks of the disease, and later, after the infection has been overcome, they return to the harmless stage.

The disease running as a true septicemia, the symptoms and post-mortem lesions are characteristic of such an infection. It manifests itself either as an intestinal or pectoral form with a febrile condition and not infrequently the symptoms and even the anatomical changes resemble those of anthrax. On post-mortem a subcutaneous exudate is found, which is gelatinous in its character. The hemorrhages are present in the connective tissue on the serous membranes, in the abdominal and thoracic cavities, the heart, etc. The lymph glands are enlarged and are

injected with blood. In the pectoral form a characteristic thickening of the interlobular connective tissue is present which tends to make the lungs appear similar as in pleuropneumonia. In the intestinal form there is frequently a necrosis of the mucosa, resulting in hemorrhages into the lumen. There are great variations in the manifestations of both symptoms and lesions of this disease and a positive diagnosis is frequently difficult. The microscopical examination in some instances may reveal the causative agent in the blood or tissues, but this may also fail, and in such cases the only way to make a positive diagnosis is by test inoculations. The disease being fatal in its character, attention must be directed towards preventing and checking all outbreaks. For this purpose vaccination has been employed with uniformly good results.

The first time vaccination was resorted to in the United States was in an outbreak of Hemorrhagic Septicemia which occurred among the buffaloes in the Yellowstone Nationl Park. The method of preparation of the vaccine used in that instance has been described by Mohler and Eichhorn in an article on Vaccination against Hemorrhagic Septicemia in 1911. Since that time this method has been employed on hundreds of thousands of animals throughout the United States and the results justify the use of the vaccine for preventive purposes.

In a recent publication on Hemorrhagic Septicemia by the Bureau of Animal Industry it is stated that cattle, sheep, swine, rabbits and fowls if treated with heated cultures of hemorrhagic septicemia germs obtained from animals of the same species as that to which they themselves belong will almost invariably become protected against injections of living cultures of the same germ, even though applied in comparatively large quantities.

Furthermore, in connection with the control of hog cholera, veterinarians have found that frequently it is advisable to use Hemorrhagic Septicemia vaccine in conjunction with the serum simultaneous treatment of cholera, especially so in localities where they learned from experience that the serum simultaneous method failed to check the disease and that hogs continued to die with marked chronic symptoms and lesions of a lung infection with hemorrhagic septicemia. In such cases it is assumed that the serum simultaneous method will not prevent the development of the pathological process resulting from the secondary

infection with the hemorrhagic septicemia organism, which naturally accounts for the continuance of losses in such instances.

Outbreaks of hemorrhagic septicemia, especially in cattle and sheep, frequently result from stockyard or stock car infections. Thus, for instance, in the fall and winter of 1915 and 1916 numerous outbreaks were reported to the Bureau of Animal Industry in which young stock cattle that had been purchased in carload lots at some of the large stockyards had developed hemorrhagic septicemia even a few days after their arrival. At the same time two flocks of sheep and one of goats were found to be affected with the disease. Thus, in order to prevent the occurrence of outbreaks, it is apparent that thorough sanitation of the stockyards and the stock cars is essential. In actual outbreaks aside from the protective vaccination a thorough disinfection of the premises is also necessary.

HOG CHOLERA.

Of the diseases of hogs, hog cholera is no doubt by far the most important, causing tremendous losses throughout the United States and other countries. It is not necessary to enter into the discussion of the symptomatology and post-mortem appearances of hog cholera, since every veterinarian is thoroughly familiar with the characteristic manifestations. It is recognized that frequently the diagnosis is difficult even from post-mortem appearances, since the characteristic lesions are not fully developed in all cases. The disease is highly contagious in its character and may be spread in many different ways. No doubt the transportation of hogs is the most important factor in the spread of the disease. This feature has been recently ably discussed in an article by Dr. Luckey, State Veterinarian of Missouri, who considers that transportation of hogs is the most important factor for the existence and spread of hog cholera. Of course, other methods of dissemination should not be lost sight of, such as infection by polluted water, dogs, birds and man.

Fortunately, we are in a position to combat this disease by vaccination and the reduction of the number of cases of cholera in the past few years has conclusively proven that it is possible to prevent the outbreaks and reduce the losses from cholera markedly by the intelligent use of hog cholera treatment.

Hog cholera serum has been probably the most important biological product produced in recent years. Its effectiveness in hog cholera caused by the filterable virus is no longer questioned.

In this instance it is also essential to have a potent serum, and to adhere to the strictest precautions against contaminations, both in the handling and administration of the serum. In spite of the fact that the protective value of hog cholera serum has been established beyond a doubt, nevertheless numerous complaints are made which question the beneficial effects to be derived from immunization against hog cholera. Various factors are responsible for such failures. Among these, probably the most commonly recurrent one is a mistake in diagnosis. Practitioners are very prone to establish a diagnosis of hog cholera in case several animals die, without determining the character of the post-mortem lesions. An insufficient knowledge of other infectious diseases of swine may also be responsible to some extent for the failure in hog cholera vaccinations. A serum without the proper potency, or, on the other hand, in the simultaneous method, a potent virus, without the potent serum, may bring about bad results. It should be understood that hog cholera serum represents one of the crudest biological products which we have at our command for combating disease, since we have no means of properly standardizing it, and of establishing with any degree of certainty the amount of protective substances contained in the blood serum.

It must be acknowledged that the study of disease of swine has been somewhat neglected. Veterinarians are prone to accept any outbreak of infection as hog cholera, frequently relying for their diagnosis on lesions which are far from pathognomonic. The lesions which are commonly accepted as those of hog cholera may also be associated with other diseases. Thus, for instance, hemorrhages in the kidneys may appear in association with any septicemic condition, as is likewise the case with the cutaneous, subpleural and subperitoneal hemorrhages. An edematous, hemorrhagic condition of the lymph glands is also not infrequently found in the presence of the kidneys of swine. When appearing irregularly and infrequently it may arise from excessive acid or oily substances in the food, from injuries or from overheating. It is therefore apparent that in order to establish an accurate diagnosis of the "virus cholera" it is essential to take into consideration everything which is characteristic of the symptomatology and anatomical changes of the disease.

German investigators have recently devoted a great deal of attention to the study of disease of hogs, especially with reference to their relation to hog cholera. As a result of this work

it has been established and substantiated by such men as Pfeiler and Joest that there are a number of varieties of bacteria of the coli-typhus group which cause affections of hogs characterized by necrosis and ulceration of the large intestines. It is therefore suggested that such cases should be designated by the common name of "bacillary hog cholera" in contradistinction to the "virus cholera."

The bacillary type of cholera appears more or less in the form of a stable affection. Once established, it is very persistent, particularly because its character is not recognized. This no doubt accounts for the many reported failures from the use of hog cholera serum. It is true that the virus cholera is the most destructive disease of hogs, nevertheless the constant losses from other diseases must be significant and have to be taken into account. From time to time reports are published that serum has proved ineffective in a certain outbreak of disease among hogs; in some instances it is even stated that the blood from such affected animals proves non-virulent. These, I believe, are the cases which on careful study would prove to be due to other infections rather than the filterable virus.

The importance of losses from hog cholera is very evident, and since the protective vaccination has proved to be very effective in this disease, one can realize the advantages and the importance of employing this treatment; but only to those cases where the serum will exert its action upon the true etiological factor; otherwise the veterinarian will be called upon to explain the failure and of course he will be apt wrongly to blame it to impotent serum, which will bring this valuable product into disrepute.

Aside from tuberculosis and contagious abortion, the four diseases discussed are of the greatest economic importance. Their occurrence as enzoötics and epizoötics necessitates a constant vigilance for their suppression before the infections become extensively disseminated.

Veterinarians should coöperate with the sanitary authorities in their effort to suppress these dangerous diseases, as only by concerted action can we hope to attain the results which are essential at the present time to the welfare of our country.

Dr. W. B. Burris has resigned his position as meat inspector at the city abattoir, Baton Rouge, La., and has entered practice at Shreveport, La.

VETERINARY ETHICS.*

N. S. Mayo,
Chicago, Illinois.

"Once upon a time" (this is no fairy tale) while a student in college we took a course called Ethics or the Science of Duty. The moral seed, presumed to have been sown, evidently fell upon rocky soil, for the only thing that memory now recalls is the name. Later, as a veterinary student, we also received some good advice along this line. This is only mentioned to show I am not qualified as an expert upon this subject.

It may be worth while to refresh our memory by reading the code of ethics of the American Veterinary Medical Association.

Section 1. Members of this association are expected to conduct themselves at all times as professional gentlemen. Any flagrant violation of this principle shall be considered by this association as unprofessional conduct, and on written charges filed with the Executive Board, may subject the violator to suspension or expulsion, as provided in Article 5, Section 7, of the Constitution.

Section 2. No member shall assume a title to which he has not a just claim.

Section 3. No member shall endeavor to build up a practice by undercharging another practitioner.

Section 4. In all cases of consultation it shall be the duty of the veterinary surgeon in attendance upon the case to give the opinion of the consulting veterinary surgeon (whether favorable to his own or otherwise) to the owner of the patient in the presence of all three. In case of the absence of the owner the veterinary surgeon consulted may, after giving his opinion to the attending veterinary surgeon, transmit it in writing to the owner through the medical attendant. It shall be deemed a breach of this code for a consulting veterinary surgeon to revisit a patient without a special invitation by the attending veterinary surgeon or agreement with him.

Section 5. In advertising, the veterinary surgeon shall confine himself to his business address. Advertising specific medicines, specific plans of treatment, or advertising through the

* Read before the Michigan State Veterinary Medical Association.

medium of posters, illustrated stationery, newspaper puffs, etc., will not be countenanced by this association.

Section 6. Any person who shall advertise or otherwise offer to the public any medicine, the composition of which he refuses to disclose, or who proposes to cure disease by secret medicines, shall be deemed unworthy of membership in this association.

Section 7. It shall be deemed a violation of the code of ethics for any member of this association to contract with or through the officers of any live stock insurance company for the professional treatment of the members' stock so insured; but this rule shall not prevent any member from becoming an examiner of risks and acting in the capacity of an expert for the same.

Section 8. Each member shall observe the code of ethics adopted by this association and be answerable to the Executive Board for any breach of the same.

The principles of veterinary ethics are largely those that have been adapted from the human medical code. In human practice great emphasis is properly placed upon the relation between the physician and patient, an ethical relation that is of much less importance in veterinary practice. This phase of ethics is largely replaced in veterinary practice by the relation between the veterinarian and the owner of the animals. There is, however, an ethical relation between a veterinarian and his patient that should never be forgotten. The veterinarian should be as humane as possible. With modern anesthetics, both general and local, much pain can be prevented, and it is the duty of every veterinarian to alleviate the sufferings of his patient as much as possible.

Veterinary ethics may be considered under three heads:

1. The relation of the veterinarian to the owner of the animal.

2. The relation of the veterinarian to fellow practitioners.

3. The relation of the veterinarian to the public, and one might add the relation of the veterinarian to himself.

A veterinarian is or should be the expert adviser to his client, so far as the health of the client's animals is concerned, and to do this he must have his client's confidence. This confidence can be gained by strict integrity and "making good" in practice. A veterinarian should be frank and, above all, sincere in his relations with a client. There is nothing that destroys confidence so quickly as deception, even though such deception is practiced at the client's request and for his benefit. The basis

of all ethics, professional or other, is strict integrity. Mistakes may be forgiven, though they are often costly, but deception or trickery lives long in human memory. The relation of a veterinarian to his client is changing, particularly in country districts, toward preventive medicine. The stockman wants to know how to keep his flocks and herds free from disease, and the veterinarian must be able to advise him, as well as treat ailing animals. Such advice should be largely negative, that is, what the stockman should not do. The positive technical treatment must be given by a skilled veterinarian, and the veterinarian should educate his clients along this line.

Recently a professor in a veterinary college was required, against his judgment, to give a course of veterinary lectures to agricultural students. This course proved to be very popular, but it was a negative course—don't do this, don't do that—but call a qualified veterinarian.

The relation of a veterinarian to his client is so extensive that it cannot be covered in a paper of this kind. Success depends largely on the personality of those involved, as well as on the tact, skill and good judgment of the veterinarian. The general principles governing the relations between practitioners are well known, so I shall only consider some phases that appear to be overlooked or violated most frequently.

Criticisms of another veterinarian's work are a frequent cause of trouble. If a stock owner is dissatified with a veterinarian's services the stockman will usually present only his views that in most cases are not sufficient to base a professional opinion upon. A successful practice cannot be built upon criticism of your fellow practitioner. In most cases such criticism injures you more than it does your competitor. It does not make friends nor increase your efficiency. If some of your so-called friends are urging you on, remember it is only the innate human desire to be entertained by a scrap—it is not done to further your interests.

Another frequent violation of ethics is cutting prices to get business. Every time you cut prices you are injuring yourself more than your competitor. A professional man is often measured by his own estimation of his ability. No one knows better than yourself what your services are worth. Anyone can cut prices, but it is not an easy matter to restore them. It takes a good veterinarian to do first-class work, and he should receive corresponding remuneration. At the present time a veterinarian

should avoid cutting prices for the returns for his work have not increased proportionally to his expenses.

The relation of the veterinarian to the public is changing very rapidly at the present time. People are becoming educated as to the importance of preventing the spread of transmissible animal disease, and the practicing veterinarian has a public duty to perform along this line. He should take an active part in outlining preventive measures to protect the live stock industry. He should be an authority to whom farmers and stockmen look for guiding help. The veterinarian should, of course, work in harmony with state and federal veterinarians. The farm adviser, farmers institutes, granges and similar organizations offer excellent opportunities that should not be neglected. There is also the local paper and live stock journals that are always looking for "copy" on subjects that are of general interest to the community. And in rural communities live stock is very important. The underlying principle should be to make yourself a valuable asset to the community.

The foregoing brings up the question of advertising. In this the veterinary profession has also followed the medical profession, which does not approve paid advertising. I believe, however, that a neat professional card in local newspapers is ethical and helpful in various ways.

A veterinarian should also use neat printed stationery. Cuts of prancing stallions or even of yourself, while they may be artistic, are unethical and should not be used. There are some things not mentioned in the printed code of ethics that are equally important. A veterinarian is a professional man, and should fulfill professional requirements. A veterinarian whose hospital does not compare favorably with an ordinary livery stable is violating professional ethics. The public today understands the fundamentals of hygiene and sanitation, and the veterinarian by his personal appearance and surroundings should fulfill this requirement.

Not all the ethics of our profession can be expressed in the written code. Ethics is the science of duty. There are business ethics that must be fulfilled for violation of these seriously impairs one's professional standing. There is also one's duty to himself to maintain the high standards that govern professional men in all phases of human relationship. You represent the veterinary profession in your community, and the profession will

be judged very largely by you. In case of doubt, it is always safe to follow the golden rule or just put ourself in the other fellow's place, remembering that—

> "The purest treasure mortal times afford
> Is spotless reputation; that alway men are
> but gilded loam or painted clay."

ABORTION AND STERILITY.*

E. T. HALLMAN,
East Lansing, Michigan.

The conception that most people have of abortion disease is that of a specific infection of the reproductive organs, characterized by premature expulsion of the fœtus. This phase of the problem I do not care to consider, except to show its relation to the problem of sterility.

Schroeder and Cotton, Wall and others have claimed that the abortion bacillus does not persist very long in the non-pregnant uterus, the latter apparently not being a favorable place for its propagation. If this is true the reason has not been given. However, the changes in the uterus resulting from pure abortion bacilli infection have enabled other pathogenic micro-organisms to establish themselves for varying lengths of time. It is these complicated infections that I wish to consider at this time. It is well known to most of you who have had any experience with abortion in cattle that failure to conceive sooner or later becomes an even more serious problem, both economically and from the standpoint of losing calves. The generally accepted opinion is that failure to breed under these conditions is a complication of the abortion infection, but due to other micro-organisms. Whether this is right or wrong is not definitely settled; but it is known that under these conditions sterility is a common condition and in most cases, whatever the cause, careful clinical examination will reveal pathological conditions apparently explaining failure to conceive.

It is not possible to consider in one short paper the various conditions causing sterility. It occurs to the writer that best use of the time can be made by confining his remarks to what has in his experience proven to be the most common condition

* Presented at meeting of Southeastern States Veterinary Medical Association, Birmingham, Alabama, February, 1919.

associated with sterility, viz., chronic catarrhal endometritis and cervicitis. Another reason for the writer taking this view of the problem is that chronic catarrhal conditions are the most difficult for most veterinarians to diagnose and treat. In the acute inflammatory conditions, the diagnosis is more easy and treatment consists largely of irrigation and drainage.

Etiologically, chronic catarrhal cervicitis and endometritis may be due to a variety of microörganisms. In the cases we have studied we have not been able to demonstrate the presence of the abortion bacillus, though they were from herds in which abortion has been a serious problem for several years. Staphylococci, streptococci and B. communior were the microörganisms usually found.

Usually the only symptom observed by the layman is failure to conceive after service. The animal may come in heat regularly, take the bull, but fails to conceive. Rectal examination reveals but little change, if any, from a normal condition. The uterine walls may be flaccid, but since there is considerable difference in the tone of normal uteri at different periods this is not of much value in diagnosis.

The best evidence of disease is obtained by vaginal examination. In order for one to recognize an abnormal condition he must be quite familiar with the normal condition. The condition of the cervix and character of the vaginal and cervical secretions in health depend upon whether the examination is made at the time of estrum or otherwise. In a state of health, except during estrum, the mucosa of the vagina and cervix is a light pink color and comparatively dry. The cervical canal is closed. During estrum, the cervical canal is partly dilated and the mucosa a deeper pink color. There is a considerable quantity of a thin, clear secretion in the cervical canal and vagina. Shortly after estrum disappears this may be streaked with blood. In chronic catarrhal conditions the secretions are increased in quantity and often show flakes and streaks of pus. Frequently there is an adhesive mucus that may be mistaken for the mucus of pregnancy. The mucus membranes are more congested and if the case is of long standing there may be hypertrophy of the folds around the external os and cervical canal.

In making vaginal examinations for purposes of diagnosis the hand and arm should be disinfected and then rinsed in clean water. Soap or the coal tar disinfectants on the hand so alter

the character of the secretions that their condition cannot be determined.

It is desired to consider the pathology of these conditions somewhat in detail, or at least what appears to the writer as the pathological condition from a study of several cases that came under his observation. I want to emphasize the importance of a knowledge of the pathology of the conditions under consideration because only by knowing this can a sound, rational treatment be outlined.

Pathologically, the changes consist of a mucoid degeneration of the superficial epithelium and more deeply seated lesions in the uterine mucosa. The superficial lesions (mucoid degeneration of the epithelium) are of importance in that they explain the altered secretions, thereby rendering clinical diagnosis possible. But they are not of the most importance from the standpoint of treatment. It is the more deeply seated lesions that are of the greatest importance to you in that they determine the character of the treatment to be given and at the same time explain the limitations of medicinal agents in the treatment of these conditions. Our investigations indicate that there are no extensive changes in the uterine mucosa indicating large numbers of highly virulent microörganisms, but that the deeply seated lesions of the mucosa consist of foci of fibrosis due to colonies of bacteria of low virulence. All grades of fibrosis may be seen, varying from small foci of granulation tissue to foci of scar tissue. Sometimes these areas are seen adjacent to the smaller uterine blood vessels, and sometimes adjacent to or surrounding the uterine glands, and sometimes independent of the glands and blood vessels. Their effect on the uterine glands is apparent. It is the old story of granulation tissue contracting to form scar tissue. If a gland is involved the resulting scar tissue interferes, no doubt, with the nutrition of the gland and atrophy is the result. We have slides showing all stages of this periglandular fibrosis from the early stages in which may be seen leucocytes in the gland lumina, disintegration of the glanular epithelium, and immediately outside of the gland a zone of granulation tissue, to the later stages, where there is atrophy of the glandular epithelium and cicatricial tissue surrounding the gland. These areas of fibrosis are not large, averaging in our cases about two hundred and fifty microns but found to be well scattered throughout the uterine mucosa. The lesions are apparently the result of multiple foci of infection and clearly show the insidious and

progressive nature of the condition. The condition suggests not a diffuse inflammatory reaction due to large numbers of microorganisms of a highly virulent type but to multiple foci of infection in the deeper layers of the mucosa, probably occurring over a varying period of time and due to microörganisms of low virulence.

I do not want to leave the impression that the changes in the uterine mucosa are very marked. A clear understanding of this is very important in that it indicates what may be expected from treatment. While there was some fibrosis of the uterine mucosa and atrophy of some of the uterine glands in each case studied, the changes were such that they could not be detected clinically nor by macroscopical examination of the uteri after they were removed from the carcass. It is of interest to note here that each case studied was a persistent non-breeder. A clinical diagnosis of chronic catarrhal cervicitis or endometritis and treatment had been given by the writer. The animals were finally sold for beef for failure to breed, though I might add that the conditions under which the animals were treated were such as not to encourage hopes of recovery.

In these cases it seems that the changes were not such as to render the animals permanently sterile. The number of glands showing atrophy were comparatively few and the amount of uterine mucosa involved in fibrosis was comparatively small. It appeared that there remained quite sufficient normal mucosa to meet the demands of a functioning uterus. The question arises, what was the cause of sterility in these cases? It seems that the answer is this: sterility was due to an active condition or process, and not due to structural changes. To repeat an often-quoted phrase, "It was functional and not organic." This latter is not wholly true, but probably the answer lies partly in both; slight organic changes giving rise to functional disturbances. It seems to me that in order to get this conception it is only necessary to consider the complex function that the reproductive organs perform.

It is a law of nature that the more highly specialized a cell or organ is, the more seriously it is disturbed by any abnormal influence. An irritant which may only cause certain lowly specialized parts to grow may cause more highly specialized parts to degenerate and die.

So it seems to me that sterility in many cases is explained by

functional disturbances and not by any extensive changes in the uterine mucosa.

TREATMENT.

If I have succeeded in conveying to your minds the apparent nature of the trouble, the limitations of medicinal agents are apparent. Our conception of this problem is that infection in these cases (and there is no doubt about infection being the primary cause) does not mean the presence of pathogenic microorganisms in the uterine cavity, but means a condition, a process, due to the establishment and growth of pathogenic microorganisms in the uterine mucosa. If you have this conception of the condition you can easily understand why the administration of medicinal agents into the uterine cavity, to the exclusion of other factors, is not going to have much effect on the condition. The usual use of medicinal agents in these cases never reach the source of the trouble in that their action is superficial and the cause is more deeply seated. It seems that recovery can only occur in case the defensive and reparative mechanism of the uterus is increased, so that the infection can be destroyed and the damage repaired. It appears that destruction of the microorganisms must be accomplished by the defensive mechanism of the uterus itself and not through the application of medicinal agents into the uterine cavity, which, to reach the infection, would have to penetrate the superficial layers of the uterine mucosa. How best to strengthen and aid the defensive mechanism of the uterus in these cases is the problem before us. I have no solution. Perhaps if we can increase the circulation through the parts by massage and other means, thereby increasing the number of phagocytes, the amount of bactericidal substances, and nutrition of the uterine mucosa, some aid may be given.

Uterine curettage has been used in woman. It is not conceivable that any large proportion of the microörganisms could be removed in this way and if any good comes from this practice it is more likely that it is the result of mechanical irritation and stimulation, rather than from actual removal of the microorganisms. Curettage of the bovine uterus is hardly possible. At this time I am using injections of iodine into the uterus and swabbing the cervix with iodine in conjunction with uterine and ovarian massage. First, the cervical canal is cleaned with a physiological salt solution or a two or three per cent sodium borate solution. This is easily accomplished by connecting a female

metal urinary (mare) catheter with a pump or fountain syringe and inserting the fenestrated end of the catheter into the cervical canal. By constantly changing its position while the solution is flowing the secretion can be removed. If it is desired to irrigate the uterus the solution may be forced into the uterine cavity until there is a moderate tension in the uterus (governed by the hand in the rectum) and then the catheter disconnected and the solution forced out by uterine massage per rectum. It is questionable whether uterine irrigations are indicated except in cases where there is an appreciable quantity of an inflammatory exudate in the uterine cavity.

If there is hypertrophy of the folds of the cervical mucosa the hypertrophied parts are removed surgically. From one to two ounces of a fifty per cent Lugol's Solution of Iodine is then introduced into the uterus and the uterus massaged in order to force it into both horns. The cervical canal is swabbed with a pledget of cotton held in a pair of uterine dressing forceps and dipped in undiluted Lugol's Solution. This is repeated at weekly or ten-day intervals if indicated. It is not believed that the injections of strong solutions of iodine actually reach and destroy the microörganisms, but it is hoped that irritation and stimulation of the uterine mucosa will react favorably upon its defensive mechanism. This idea may be erroneous, but, anyway, the treatment of chronic catarrhal cervicitis and endometritis is still in the experimental stage.

LIVE STOCK EVOLUTION IN PROGRESS.*

J. R. MOHLER,
Chief, Bureau of Animal Industry,
Department of Agriculture.

A meeting of this kind is always a happy occasion. I am glad to see that there is little formality. That is one reason I enjoy attending a meeting of live stock raisers. Sometimes I have the feeling that the live stock industry has become important because of the frankness and the clear vision of the people it attracts as much as through its own intrinsic merits. I say that in all candor. Everyone who studies live stock learns a great deal about other things as well, including much useful knowledge about people. The trained eye of the live stock inspector and of

* Address before Southern Cattlemen's Association, New Orleans, La.

the stockman sees things as they actually are and places an accurate valuation on them. He readily sees through the shell of formality and distinguishes things that are genuine from those that are not. So I am not only glad to be here, but I ask you to take my remarks informally.

As most of you know, the Bureau of Animal Industry is well scattered over the country. It is principally a field organization. My desk happens to be in Washington and I spend most of my time there, but less than 8 per cent of the entire Bureau staff is in Washington. That means that more than 92 per cent of the Bureau's members are distributed over the country, more particularly in States where live stock raising is already prominent or is developing. I mention this so that you will know if our point of view fails to have proper breadth the fault is personal rather than that of the Bureau's organization.

SOUTH IS RIPE FOR RAPID CHANGES.

It has occurred to me that you would be interested in a few thoughts about the live stock changes that our own generation is witnessing. When we think of evolution, the mind generally goes back over the pages of history, or even to the period before history was written. We think of it as work which nature performed, especially with reference to the descent of man. Also, it is difficult to think of evolution in a new country like the United States. Yet this nation already has played a great part in the development of new animal life and the Southern States especially are ripe for many changes.

More than that, these changes—and they are changes for the good—can be hastened by the skill of man. Those who are here today can play an important part in this work. That may seem to some of you—and it does to me—a great responsibility. It *is* a great responsibility, but we have come over a long, long trail of experience.

LIVE STOCK CHANGES WITHIN THREE CENTURIES.

Thanks to our increasing knowledge of heredity, we can direct evolution of domestic animals almost at will in a general direction. To get a prospective of our present position, let us go back about 300 years, to the time of the Pilgrim Fathers. The meat sources of America at that time were wild animals entirely. There was no domestic live stock worth mention. Today the domestic animals of the United States number more than two hundred

and seventeen million, or twice as many as the number of people. The beginning of live stock breeding in the United States was slow, of course. Most of it has occurred in the last 100 years. Yet the average increase in horses, mules, cattle, sheep, and swine for the last three centuries in this country has been about 700,000 animal each year.

Within the last century the buffalo has become practically extinct and other wild animals have dwindled in numbers. Domestic meat animals have replaced wild game as a food for mankind almost entirely. Three hundred years is scarcely nine generations, a remarkably short time for such large-scale evolution of animal life. Now, what is an application of these facts? How can we use them? Their principal value is to give us the confidence of experience. More useful facts, however, are those of comparatively recent date. In fact, they have not reached the public to any extent. The Bureau lately has been studying live stock trends in other countries as well as in the United States, and some of the apparent developments are most interesting. Without going into detail let me give you the general facts regarding cattle and dairy cows, in which the South will soon be taking more interest than today. The conditions I am about to describe cover the period from 1850 to the present year.

FEED LIMITS NUMBER OF CATTLE IN WESTERN EUROPE.

Generally speaking, the number of cattle in the older countries has increased but slightly during that 68-year period. This is true of such countries as Norway, Sweden, Denmark, Holland, France and Germany. For the most part there has been a greater increase in the number of cows kept for milk than in the total number of cattle, an observation indicating one of two things. Either the milk cow is gradually replacing the beef animal or else the census takers and statisticians have used greater care in distinguishing between dairy cows and cattle. But in general there has been only a small increase in the number of cattle in Western Europe during the period from 1850 to 1918, inclusive, due probably to dependence on imported feed. Yet, even with the war as a disturbing factor, the output of dairy products increased considerably during the period. Denmark, for instance, has improved her cattle until the average cow now yields somewhat more than six thousand pounds of milk annually, compared with about four thousand pounds in the United States. For con-

venience, I am speaking in round numbers. So it appears that even after a fairly definite maximum is reached in the number of cattle kept, dairy production may still increase through skillful breeding. Observations in the less densely settled countries are quite different. In Australia, Argentina, Uruguay, Canada, and the United States there has been a rapid rise in the number of cattle kept both for milk and beef during the same years, 1850 to 1918. The increase still continues and from European experience we have every reason to look for greater meat and greater dairy production in these newer countries.

REFRIGERATION STIMULATES INTERNATIONAL MEAT TRADE.

It is important also to remember that modern methods of refrigeration and canning have transformed the long-distance trade in meat and dairy products. Shipping live animals for slaughter was never very satisfactory. The animals and the necessary feed required too much shipping space, but meat frozen by artificial methods is a compact commodity and may be shipped safely to any market in the world. The lesson from abroad, therefore, seems to be this: If the United States is safely to retain the agricultural leadership established by the war, we must improve both the quality and the quantity of live stock. We must improve the quality especially and do it on a sound basis of economics. Perhaps we can not compete with Argentina and Australia in supplying cheap beef to Europe, but we should at least be able to feed our own population.

You may ask why that is necessary. There are many reasons, of which I need mention only a few. Failure to mantain our live stock in proportion to our population means dependence on other countries. It means dependence on them for meat, for leather, and for animal fats. It means dependence on them also for fertilizers with which to maintain crop yields in the absence of manure. It may even mean dependence on them for milk with which to feed our children, as Europe lately has been depending on the United States for milk in condensed or powdered form. In other words, if we fail to feed ourselves or to satisfy our home market, someone else will, and in fact is already doing so.

DEVELOPMENT IN SOUTH AMERICA.

Imports of meats and meat products by the United States in 1918 exceeded one hundred million pounds. These were received

principally from Argentina and Canada. A report lately received from the American Consul General at Buenos Aires contains some public remarks made by the manager of an Argentine packing establishment and they are remarks which are very illuminating. Among other comments, he stated that "large quantities of canned meats are now regularly shipped to the United States, the great cattle country of former years." Also "that the United States can no longer be regarded as a meat exporting nation."

Incidentally, the South American slaughtering and meat packing establishments are employing about thirty thousand workers, and in 1917 that country exported more than half a million tons of frozen and chilled meats, estimated to be about 55 per cent of the total exports of this commodity from all countries. Yet the first ship to carry meat chilled by artificial refrigeration was in the spring of 1879, scarcely 40 years ago. So you can see that important changes involving the meat industry are going on constantly and that South America is preparing to feed nations that fail to provide meat for themselves. Now, how can Argentina, for example, produce meat cheaply enough to compete with the home-grown meat products of other countries? The consular report mentioned answers that question very definitely. "There has developed," it states, "the systematic improvement of herds by the infusion of the best stock blood of the world, which has resulted in types of cattle even superior to the imported strains."

"The extensive growing of alfalfa, which insures an abundance of the best pasturage for cattle feeding, has made it possible to support and fatten one animal per hectare (2½ acres) where two hectares (5 acres) of unimproved land were needed to support one animal which had later to be fattened on improved land."

Moreover, the cattle are in the open throughout the year. Those conditions are strikingly similar to conditions here in the southern part of the United States and I want to call your attention especially to the importance of better types of live stock. The proper type of pure-bred animal—whether cattle, hogs, sheep or poultry—makes its gains vastly more economically than scrub stock. The same is true of dairy production. Lately I was interested in reading a report from Dallas County, Texas, which stated that the feeding cost per gallon of milk was 39 cents for scrub cows, whereas in a dairy having pure-bred Holsteins it was only

16 cents. Some of you may be more familiar with the details of that report than I am, but the condition is a typical one.

THE TIME ELEMENT AS AN IMPORTANT FACTOR.

The splendid progress you have made in tick eradication is gratifying. In comparison with periods commonly considered in connection with evolution, the work began late. The eradication of the Texas fever tick started, as you know, less than 13 years ago, yet nearly two-thirds of the area is now clean. How long is it going to take you to make the cattle tick an extinct creature in the United States?

Hog cholera eradication along systematic lines began even later, in 1913, seven years after the campaign against the tick. The progress there also is encouraging. Last year about five and a half million hogs were vaccinated and the death rate from cholera was the lowest on record, less than 4 per cent. The number of hogs dying from hog cholera in 1918 was about 60 per cent less than the year when the work began. So it looks as though hog cholera can be suppressed entirely within a few years provided the work is pressed with vigor, as I am sure it will be.

Systematic eradication of tuberculosis by the accredited-herd plan began still later, only about a year ago. About 300 herds are now fully accredited—a rather small figure, to be sure—but still a healthy beginning. You can take that remark in two ways.

With these three scourges at last out of the way, or reduced to impotency, and the lesser ailments cut down in proportion, the United States should be a live stock region where animal improvement should continue with accelerated progress. Already we are blessed with freedom from certain scourges of the old world and the southern hemisphere. Veterinarians are familiar with those scourges, at least by reputation, but I doubt whether even the names of many of the foreign contagions are familiar to some who are here. There is rinderpest, surra, pleuro-pneumonia and Malta fever. There is also foot-and-mouth disease which, as an occasional visitor to the United States, is more familiar.

THE IMPORTANCE OF QUARANTINE SERVICE.

The inspection and quarantine service of the Bureau keeps all those destructive animal plagues at bay. In fact, the Bureau of Animal Industry was established by Congress in 1884 to erad-

icate pleuro-pneumonia. This was accomplished in several years and no case has occurred since 1892. Thus, we have been free from it for a quarter of a century. In brief, the United States has less than half as many serious animal scourges as exist in the world, largely because this country has had a good start in disease control and is following it up. That phase of the work, however, has been the prevention of loss; an equally important task is the upbuilding of what we may call our live stock assets.

You are all familiar with the principle known as the survival of the fittest. Without going into the details of evolution, let me say that scrub live stock is no longer fit for perpetuation in the United States. A scrub is wasteful of feed, and wasteful of its owner's labor. The scrub animal has served its purpose as a connecting link between the old obsolete method of farming and the new progressive methods. Thousands of farmers in this country already have discarded scrub stock and are better off because of that decision. Pure breds are worth more to keep and are worth more to sell. The scrub animal has been useful as a connecting link, but our aim from now on should be to make the scrub extinct and to make it the missing link of the future so far as live stock is concerned. That cannot be done immediately, but it is the goal toward which we should work.

USEFUL FACTS ABOUT HEREDITY.

The Bureau lately has been conducting some experiments in the study of heredity, and you may be interested in some of the results already evident. These results are noteworthy, not so much as furnishing new discoveries about animal breeding but by establishing a sounder basis for the principles of heredity which are already accepted. Here are some outstanding points.

"The heritage transmitted by an animal can not be altered by any system of feeding, or training, or by accident." A bull, for instance, may be expected to produce just as good calves before or after he is in the best show condition as when actually in that condition.

A law of heredity which every one should remember and should impress on all live stock owners is this: "The person who simply by careful management tries to produce continuous improvement in a scrub herd is doomed to disappointment." Still another important breeding law is the following: "Selection based on progeny is more effective than selection based on individual merit." That emphasizes the importance of knowing the family

history of breeding stock and studying the production records instead of relying too much on the appearance of the individual animal. When a person buys a pure-bred animal he is really buying more than an individual; he is obtaining the heredity traits of its ancestors as well.

I need not remind you that pure-bred stock is harder to buy and easier to sell than any other kind. That is why the Bureau is encouraging community breeding associations, pig clubs, cow-testing associations, bull associations, and similar activites. Such organizations focus attention on the value of better live stock and eventually become sources of pure-bred animals of merit. Compared with the status of community live stock work a few years ago, the present progress seems encouraging, but on closer scrutiny of the field we see that improvement of live stock is really just beginning. For instance, cow-testing associations in the United States numbered about 357 last year, composed of dairymen owning approximately 172,000 cows. That seems a considerable number, but it is scarcely three-fourths of 1 per cent of the dairy cows in the United States.

Probably not many of you have heard of the employee in the patent office who about fifty years ago resigned during a temporary lull in the work. His reason was based on the fear that everything which could be invented had been invented and he desired to change his employment before the patent office was discontinued. And that was before the invention of the telephone, the automobile, phonograph, airplane, submarine, wireless —you can complete the list for yourself. In fact, since the time that employee of short vision resigned, the really marvelous inventions of all centuries have taken place.

So in dealing with live stock, let us realize that the best years are coming; also that we are making progress not with machinery which has no power to perpetuate itself, but, rather, with living creatures, and that every accomplishment is multiplied by succeeding generations. From the account of the cow-testing work you will see that even with our present knowledge of heredity and what is happening in the live stock industry throughout the world, we are just beginning scientific development in animal improvement. It would go on faster, I am sure, if there were more meetings like this where we could exchange ideas and information. The press, the various extension agencies, and other organizations, however, have been of untold service in carrying agri-

cultural information into the homes of live stock owners on whom the actual rate of progress finally depends.

The main thoughts I want to leave with you are these: Animal evolution is constantly going on. You are working here in the South where the field for improvement is ripe. If you are just beginning, begin right. If you have started wrong, get right as soon as you can. This means the wise choice of breeding animals and following out a consistent plan. The kind of live stock which the South is to have eventually is merely the sum total of what each farmer chooses. You can help to make the unprofitable scrub cow extinct. The method is obvious; just stop breeding that kind. You can continue the extermination of the principal animal diseases, and once they are stamped out, the quarantine services of the Bureau and the various States will see that they do not get back.

SHORT COURSE FOR SOLDIERS AND SAILORS.

The Massachusetts Agricultural College has just announced its policy to repeat as often as may be necessary the special six weeks short course in agriculture and horticulture for returning soldiers and sailors. Such a course was given at the college during February and March of this year. The success of the first course and the number of inquiries received from men in service in the United States and France has induced the college to make this provision for men who wish a short period of practical instruction as a preparation for farming.

It is expected to make special provision during the summer term, beginning June 30, for instruction of soldiers, and if there is sufficient demand for it to give a special six weeks short course soon after college opens next fall.

Representatives of the private veterinary schools held a meeting in Chicago May 12 to consider entrance requirements. There were present representatives from the Grand Rapids Veterinary College, the Indiana Veterinary College, the St. Joseph Veterinary College, the McKillip Veterinary College, and the Chicago Veterinary College. It was unanimously agreed by these representatives to adopt the requirements of the Bureau of Animal Industry, which demand two years' high school preparation for the session of 1919-20. This preparation to be certified to by the State Department of Education.

CLINICAL AND CASE REPORTS.

MAN DIES FROM ARSENICAL POISONING BY ABSORPTION.

E. I. Smith,
Inspector in Charge, B. A. I., Baton Rouge, Louisiana.

A local cattle inspector (layman) while engaged in the work of tick eradication in Louisiana spilled some of the concentrated arsenical preparation on his shoulder while engaged in charging a vat for the morning dipping. He did not take time to wash off the solution, but, on the other hand, proceeded to supervise the dipping of about 150 head of cattle. Suddenly he became sick and two physicians were called, who, after closely observing the symptoms and noting the history of the case, pronounced it arsenical poisoning. In spite of skillful medical attendance the patient died six hours after the accident.

The writer has been actively engaged in the work of tick eradication since 1909 and cannot recall a similar fatality in man as a result of handling the concentrated dip or in preparing the crude chemicals. Heretofore, in a few instances, inspectors have been slightly nauseated from breathing the steam in the preparation of the boiled dip containing arsenic, but not of a serious nature. The concentrated solution in this case required that ten gallons of it be diluted with 1,500 gallons of water, to yield a quantitative test of 19 one hundredths of one per cent of arsenic, which in the end is harmful only to ticks and other parasites of a similar nature.

SCLERODERMA IN HOGS.

I. E. Newsom,
Colorado Experiment Station.

In May, 1918, there was received at the veterinary hospital of the Colorado Agricultural College the pig whose picture accompanies this article, with the history that two more were affected in the same way. These hogs had been on a ranch near Cheyenne Wells, Colorado, for several months previously and

were running with a large herd. The owner informed us that he had never imported hogs from foreign countries.

It appears that the disease was first manifested by a hardening of the skin over the shoulders and a rigidity of the tips of the ears. This hardening continued down the ear until it had invaded the larger part of these organs, also over the back and part way down the sides of the animal. The process was very slow-going and took probably three months to complete. At the end of this time there began a separation, noticed at the edges, and finally the whole scale, in some places two inches thick, sloughed off, leaving a bare, raw surface, but with practically no hemorrhage. Most of this time the hog appeared to be doing fairly well, but there would be days when he would refuse food. Finally, some two or three weeks after the slough had taken place, he refused food entirely for several days and was found dead one morning.

Unfortunately, we did not work during this time to determine the cause of the disease and present it here merely because

it seems to us peculiar. Hutyra and Marek have described the condition under the name we give above, but do not assign any cause for it. That three animals in the same herd should be affected and then there should be no further spread seems to us

a little unusual. Before the slough took place the hog had the appearance of the one pictured by Hutyra and Marek under "Swine Erysipelas." There is, however, little reason to believe that it was this disease.

TUBERCULAR ENCEPHALITIS AND CEREBRO-SPINAL MENINGITIS.

S. A. Goldberg, Department of Pathology, and W. D. Way, Department of Medicine, New York State Veterinary College, Cornell University, Ithaca, New York.

A two-year-old black and white pure-bred Holstein heifer has been suffering from digestive disturbances for several days, has progressively become emaciated and recently weakness of the legs has been observed. The heifer came from a herd in which

a large number were tubercular. This animal was tuberculin tested sixteen months previously with apparently negative resuts.

Recently the heifer has been treated for sterility, a corpus luteum being squeezed from the left ovary on two different occasions.

On examination, the heifer was down, lying on the sternum. Efforts to rise resulted in failure to accomplish more than a mere floundering around. Considerable depression was evident. Condition was poor, hair coat roughened. Eye was dull. There was no evidence of fever. Extremities were cold.

Appetite was very poor. A pail of cold water was given the heifer, which seemed to cause distress, expression of pain, trembling over the whole abdominal region, and the heifer looked around at the abdomen anxiously. There was very little peristalsis on auscultation, contractions of the rumen were very weak, and the abdomen was very small. Rectal examination revealed nothing but severe pain and straining. Feces were scanty and harder than normal.

There was marked increase in sensitiveness over the whole abdominal region and along the back. This, together with the paralysis, led to the provisional diagnosis of meningo-myelitis. Peritonitis was also suspected on account of the hypersensitiveness of the abdomen. Tuberculosis was also considered on account of the herd history.

On a second visit, two days later, hyperesthesia appeared more marked and there was apparently no improvement resulting from the administration of stimulants of aromatic spirits of ammonia and nux vomica.

Four days later a third call was made, and the heifer was found prostrated on the left side, head, neck, and all four feet stretched out. There was apparently complete paralysis, as any attempts to raise the head were fruitless. Heifer was lying perfectly quiet for a few minutes and then went into a spasm of kicking with all four feet. This lasted but a short time and she became quiet again until another attack.

Animal was in a dying condition and immediate slaughter was advised and resorted to. Killed by bleeding. Autopsy immediately after.

AUTOPSY PROTOCOL.

External examination showed decubital sores on the limbs and around the tuberosity of the ilium. The animal was in poor condition.

Internal examination showed that the appearance of the peritoneum and the arrangement of the organs were normal.

In the spleen there were numerous petechiæ and reddened fibrous tufts on the capsule. On section the spleen appeared normal.

The kidneys were lighter in color than normal. On section, they bulged, the cortices were lighter than normal, while the medullæ were hyperæmic. The capsules peeled easily.

The liver was lighter in color than normal. On section, it bulged, and the parenchyma was of a hazy appearance.

The bladder was greatly distended by about two liters clear urine. Otherwise it was normal.

The ovaries showed slight fibrosis. Otherwise the genital organs were normal.

Two of the mesenteric lymph glands were slightly enlarged and contained caseous and calcified nodules 5 mm. in diameter. The remaining abdominal lymph glands were normal.

In the thoracic cavity there were numerous adhesions 1 - 4 cm. in diameter between the parietal and the visceral pleura. These adhesions were between the diaphragm, as well as between the costal pleura and the visceral pleura. They were composed of yellowish caseous and calcified material and a considerable amount of connective tissue.

In the left lung there were solidified areas 3 - 8 cm. in diameter in the cardiac lobe. On section, these areas were composed of caseous and creamy pus, in which there was a considerable amount of calcification. The rest of the lung was nearly normal. There were areas of emphysema in the right lung, otherwise it was normal.

One of the posterior mediastinal lymph glands was 20 cm. long, 10 cm. wide and 8 cm. thick. On section, there was yellowish creamy pus in the center, caseous material containing calcified areas at the periphery, and around this mass there was a considerable amount of connective tissue. The rest of the mediastinal, as well as the bronchial lymph glands, were enlarged by caseous nodules varying from 5 mm. to 1 cm. in diameter. The

superficial lymph glands and those about the head were apparently normal.

The heart and pericardium were normal.

In the brain, the meninges as well as the brain tissue were markedly congested. On opening the olfactory lobes a large amount of yellowish, slightly turbid liquid escaped. The lateral

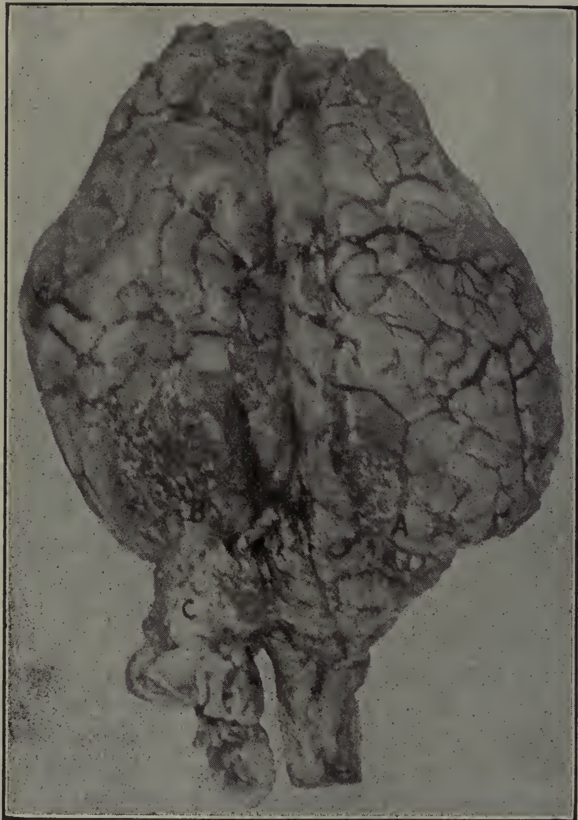

FIG. 1

ventricles were greatly distended by yellowish liquid. The vessels of the floor of the lateral ventricles as well as the choroid plexuses were greatly congested. In the posterior part of the cerebrum the meninges were adherent to each hemisphere by dense connective tissue, for an area of about 2 cm. in diameter. Under the meninges in these areas the cerebral tissue was of a yellowish brown color and denser than the surrounding tissue. These

areas were more or less circumscribed. The area in the right hemisphere was 2 cm. in diameter, in the left hemisphere 3 cm. in diameter. On section, these areas were of a yellowish brown color containing fine calcified granules. The right one extended into the cerebrum for an area of 2 cm. into the brain tissue. The cerebral meninges around these areas were covered by a diffuse yellowish connective tissue growth in which there were whitish connective nodules about 1 mm. in diameter.

FIG. 2

The spinal meninges were covered by a diffuse yellowish connective tissue growth about 2 mm. thick throughout the length of the cord. There were also scattered whitish connective tissue nodules 2 mm. in diameter. The spinal fluid was greatly increased and of a yellowish color. A larva of *Hypoderma bovis* was found under the meninges in the lumbar region.

Microscopically, the yellowish brown areas in the cerebrum were composed of very small nodules. The centers of these nodules were necrotic. The necrotic areas were surrounded by zones containing epithelioid cells and numerous giant cells. Around these zones there were lymphocytes and connective tissue. The meninges were thickened by embryonal as well as by adult connective tissue cells with numerous various sized blood vessels. Scattered in this proliferating tissue were numerous various sized giant cells and lymphocytes. There was also an increased amount of mesothelium. There was no necrosis in the thickened meninges. The spinal cord itself was apparently normal.

Sections of the lesions in both the cerebrum as well as of the meninges showed the presence of individual rod-shaped acid-fast bacteria.

DIAGNOSIS.

Immediate Cause of Death.—Bleeding.

Fatal Illness.—Tubercular encephalitis and cerebro-spinal meningitis (chronic caseous encephalitis and chronic productive cerebro-spinal meningitis).

Primary Lesions.—Apparently tubercular lymphadenitis and pneumonia.

Secondary Lesions.—Acute parenchymatous nephritis and hepatitis.

Parasites.—*Hypoderma bovis* larva in the spinal meninges.

DESCRIPTION OF PLATE.

Fig. 1.

A. Tubercular lesion right cerebral hemisphere.
B. Tubercular lesion left cerebral hemisphere.
C. Adherent cerebral meninges.

Fig. 2.

A. Tubercular lesion right cerebral hemisphere on section.
B. Tubercular lesion left cerebral hemisphere on section.
C. Adherent cerebral meninges.
D. Enlarged right lateral ventricle.

Dr. George H. Berns of Brooklyn, who graduated from his Alma Mater in 1879 and who has reached the three score and ten period of his life, retains splendid vigor and a deep interest in all matters veterinary. For the past two years he has returned to teaching clinical surgery in his Alma Mater in New York City.

NOTES ON OBSTETRICS.

JAMES A. WAUGH,
Pittsburgh, Pennsylvania.

A graduate of several years' general practice called me in consultation on a bad case.

Patient.—Grade Percheron mare heavy in foal and in bad condition, blind and suffering from chronic fistula of the withers; slight pus discharge and much fibrous thickening or hypertrophy of tissues; aged about 11 years and fairly well nourished.

History.—Neighbors stated they observed indications of labor pains and parturition in this mare in the pasture field as they were going to church Sunday morning; but owner did not observe the case till Monday, and then realized a veterinarian's services were required. Fœtus lying on its back and front feet presenting; then ropes were applied and limbs drawn out to carpus, and veterinarian amputated them, but could not deliver, and then called the writer in. We applied ropes on lower forearm above amputations; skinned upwards and applied traction and delivered the balance of the limb, including scapula; then applied similar methods to other limb. Found lateral deviation of head, folded backwards on bent neck after much searching; I got my hand on angle of lower jaw and brought it up and forwards so that the other veterinarian got his middle finger in corner of mouth and introduced a hook into the mouth and drew the head and neck into line; then we looped a rope around lower jaw, stuck iron hook into orbital socket; applied traction of four men, and were compelled to use compound wire fence block and tackle to effect delivery. Had the mare a while in swinging stocks but removed her for final delivery with tackle. Gave stimulants and put her in a box stall at 10 p. m., and she lived two days. This was no single veterinarian's case.

CASE NUMBER 2.

Subject.—Grade Holstein cow with second calf, undersized, and bred to a very large bull.

Condition.—Hind feet presenting and lying on its back; delivery delayed and impeded by disproportion in size of fœtus and dam. Applied ropes to the limbs and directed the dairyman and his sons to pull and they soon pulled the cow out of her stall. Then we reversed her with tail to manger, and they pulled away

faithfully for over one hour, and finally delivered a live calf, and it and mother did satisfactorily. We were all agreeably surprised as we expected a dead calf and possibly a dead cow later.

CASE NUMBER 3.

An old Toronto graduate with twenty-two years' experience called me in consultation about a case that he had failed with two days testing his ability.

Subject.—Boston terrier bitch mated with a fox terrier dog; pups dead and emitting a bad odor. Gave mild creolin-pearson in warm water douche; examined and had the other veterinarian clamp his hands around the patient's chest and hold her on her feet. I applied forceps and delivered three pups and douched with a warm water permanganate of potash solution and completed the case in twenty minutes' time. The veterinarian stated over the phone that he had the case two days and failed and I could do no better, only satisfy the woman owner; and I jocularly said, "Wait till you see me operate, then you will say I am the smartest man that ever listened to old Andy Smith." In fact, I went out to win this time, and I enjoyed the fun.

CASE NUMBER 4.

I have had four cases of eversion of vagina in large bitches during the past year, all being exposed for some time, and were swollen and in bad condition. Decided to stitch and amputate after cleaning up with mild astringent and antiseptic lotion; and all made rapid and satisfactory recoveries. It is necessary to remove the sutures in six or eight weeks, as they will cause an irritation and vaginal discharge which alarms the owners.

REMARKS.

I believe our veterinary colleges are not yet able to afford sufficient clinical material to give the necessary instruction in practical obstetrics, and the average graduates are compelled to learn the practical working problems after leaving college, which requires much careful clinical experience and some consultations; and every veterinarian should have good friends in his profession and a well-stocked reference library. Remember what Hoskins tells us about conserving the live stock interests and animal wealth of our country. Government reports state there are two hundred million dollars' worth of live stock dying in this country of preventable diseases every year. That should convince us

there is room for us and many other new veterinarians in this country. Perhaps we have been too cosmopolitan coming from many diverse colleges, large and small; long and short terms, and from various states and countries, but the recent ruling of the Surgeon-General's office, U. S. A., and the recommendations of the B. A. I. and Civil Service Commission, will compel us to conform towards definite and established conditions in our profession.

NEVADA ACT PROVIDES FOR RECIPROCITY.

The Nevada State Legislature at the 1919 session passed an act regulating the practice of veterinary medicine, surgery and dentistry.

The act provides for registration of existing practitioners of four years' standing without examination and future registration of graduates eligible to take the examination for appointment as veterinary inspector in the Bureau of Animal Industry after passing a satisfactory examination by the State Board, and also reciprocity with other states having an equal standard.

The act is to be administered by a State Board of Veterinary Medical Examiners consisting of three members appointed by the Governor for a term of three years, one to be appointed each year. Governor Boyle has appointed the first board as follows: Dr. Robert Dill, Reno; Dr. George L. Nichols, Yerington, and Dr. F. H. Baker, Gardnerville.

The board meets for organization at Carson City the first Monday in May, 1919, and the law becomes effective July 1, 1919.

SOME PRACTITIONER.

Sam Brown with an overseas cap and two bars on his arm was back in town.

"Hello, Sam, haven't seen you for a long time. Where have you been?" asked an old acquaintance.

"Ah's been ovah in France wid da United States Vetahnahy Fo'ces."

"Veterinary? I guess you mean veterans, don't you, Sam?"

"No, Ah reckons Ah means just what Ah says—vetahnahy. Ah jest naturally been a vtahnahy—feedin' them German dogs gunpowder for they distemper."—Ex.

ABSTRACTS.

LINGUAL CANCER.

In his Bradshaw lecture on Cancer of the Tongue, Mr. D'Arcy Power referred to the fact that it is almost entirely a human disease; it is always of one type; it is unknown in children; it is common in men, rare in women, and is not associated wth any inherited predisposition to carcinoma. He gave an interesting description of the disease from the historical standpoint, pointing out that it did not become important surgically until the seventeenth century, the Greek, Latin, and Arabian writers on surgery hardly mentioning it, and so far as can be ascertained at present it is unknown to the Anglo-Saxons.

"The first definite notice of cancer of the tongue is the case of Ralph Freeman, who died on March 16, 1634, whilst serving the office of Lord Mayor of London. He suffered from secondary hemorrhage, and it was the opinion of the physicians and surgeons who were in attendance upon him that a mercurial course might have been of use at an earlier period of the disease. The second recorded case occurred in Germany, and was looked upon as a miraculous punishment for cursing the clergy. The story runs that 'lately a certain baron spoke abusively to all and sundry but kept his most venomous shafts for the clergy and for those who devoted themselves to God's service. One day a holy brother of good repute whom he had just lashed said, "Your foul tongue has overlong deserved that punishment from an offended God which it will shortly receive." The baron rode off undismayed, but a few days later a small swelling began to grow at the side of his tongue. Little by little it increased in size until it became an inoperable cancer, and the baron, penitent and confessed, died miserably afflicted.' From the middle of the seventeenth century onwards cancer of the tongue became so frequent that it was no longer necessary to invoke a miracle for its production. At the present time cancer of the tongue is known to have occurred in one horse, three cats, and one dog. All these animals were aged, and in each the cancer was of the squamous-celled variety. It appears fair to assume, therefore, that lingual carcinoma has always occurred in men and domesticated animals; that originally in man it was no more frequent than it is now in animals;

but that from the seventeenth century onwards it has increased out of all proportion in man, whilst the incidence has remained stationary in animals."—*Lancet* (Lond.).

EPITHELIOMA OF THE PENIS IN A PONY.

Captain J. F. D. Tutt, M. R. C. V. S., F. R. M. S., Winchester.

The subject was an aged pony, used for occasional short journeys into town.

History.—The owner came to me on September 3, 1915, and requested me to see the animal, as it had great difficulty in urinating, and the sheath was very much swollen. It was also rapidly losing condition. As it was an old favorite he desired to have it remedied if possible.

On arrival at the stable, I examined the sheath, and endeavored to withdraw the penis, but was unable to do so on account of the swelling. I was able to feel that the tip of the penis was rough, and that a growth was present, and I accordingly advised surgical measures.

An operation was carried out on September 7. The animal was cast and anæsthetised, and when well under the influence of the anæsthetic, the penis was withdrawn, but only with the greatest difficulty, and when secured with a piece of tape, was found to be covered with cauliflower-like excrescences on the end, and for a length of five inches was greatly enlarged and hardened.

The urethral opening was practically obliterated, and it was impossible to insert a catheter, even when the canal was slit open for a length of 3—4 inches. The healthy portion of the penis was secured by a piece of tape, the ends of which were held by an assistant.

The diseased portion was then carefully removed, and the slit portions of the urethra were sutured to the end of the stump in such a manner as to diminish the risk of stricture.

The patient made a good recovery and was able to urinate quite freely until its recent destruction on account of age, etc.

Prior to the operation just described, a previous operator had removed some papillomata (according to the owner) some two years before.

Microscopical Examination of Growth.—A paraffin section was obtained in the usual way, cut and suitably stained.

The penis was found to be infiltrated by an extensive malignant growth, having the structure of a squamous epithelioma. It was composed of ingrowing epithelial columns with cell nests and keratinoid changes—exactly like the same growth in man.—*Vet. Rec.*

PRIMARY NOCARDIASIS OF THE LACHRYMAL GLAND.

J. B. Christopherson, M. A., M. D. Cantab., F. R. C. P. Lond., F. R. C. S., Eng., and R. G. Archibald, M. B., Ch. B. Edin.

The following is a note of a case of primary nocardiasis of the lacrymal gland, caused by a species of nocardia hitherto undescribed. The lacrymal gland appears to be one of the most remarkable glands in the body. Having a few disorders of its own, it fulfills its destiny undisturbed by the disorders of the outside world, content to be left alone to administer its secretion to the great master-tissue, the eye. The disease here recorded represents nocardiasis or actinomycosis, in which the causal agent is a germ or fungus, which grows readily ærobically and produces arthrospores.

The patient, a male aged 22, was admitted to hospital suffering from a swelling of the right eye, and inability to open it. The duration of the case was three and a half years. There was neither scar nor wound visible. The eyelids could not be everted, but when raised a thick yellow discharge poured out, and the whole conjunctival surface of the upper lid appeared to be rough and granular, with deep ulceration in parts. The swelling was painless, and was of doughy consistency, though without œdema. There was a bulging forwards of the fornix of the conjunctiva. No lymphatic glands were enlarged, and the sight was unaffected. The eyeball itself was not invaded, nor were its movements involved, neither was photophobia or lachrymation present.

Under chloroform, the growth was dissected away; it appeared to have commenced in the lachrymal gland, and to have spread into the upper lid, invading the tarsal cartilage. It extended also somewhat between the eyeball and the bony orbit, along the ducts of the lachrymal gland.

Sections showed the morbid histology commonly associated with a fungal infection. A portion of a grain flattened between a slide and cover-glass showed that it was composed of the typical

nocardial bacilliform hyphæ, with rounded bodies or spores, the whole being held together in a dense matrix. The reactions in various culture-media were investigated. The animal experimentation has not been concluded, but the condition does not seem to be pathogenic to the grey monkey.—*Lancet* (Lond.).

THE ETIOLOGY AND PATHOGENY OF RACHITISM.

De Biagi Fernando contributed an interesting article upon this subject to the *Revista Medica* for 1917. There is a theory that rachitism depends upon a disturbance in the function of the glands of internal secretion, and especially of the thymus, supra-renal capsules, and thyroid glands. So far back as 1858, Fredebleu sought to establish a connection between the function of the thymus and the development of the osseous system; but it may be said that the true origin of the thymic theory of rachitism is due to Basch. He observed that in rabbits and dogs, four or five weeks after the ablation of the thymus there were alterations in the general development, and in the case of fracture of bone disturbances in the formation of the callus. From this he concluded that the thymus gland throws into the circulation a substance which may exercise an important function during the period of growth. But the administration of fresh calf thymus to rachitic patients gave no results to Stolzner and to Lissauer; and later experiences demonstrate that, though disturbances of the thymus may have influence upon the general growth and upon the calcification, we cannot certainly find any co-relation between these disturbances and rachitism.

At a later date, importance was attached to insufficiency of the supra-renal capsules, the office of which seemed to be to regulate organic changes and the metabolism of the various tissues and animal organs.

Stolzner was the first to treat rachitism with extracts of supra-renal capsules, and obtained satisfactory results. He observed improvement of the craniotabes, eruption of the teeth, and subsequent diminution of the fontanelle, of the thoracic deformities, and of the alterations of the epiphyses.

Prof. Bossi, of Genoa, having in repeated experiments upon sheep constantly observed that the ablation of one supra-renal capsule provoked a true osteo-porosis, treated several cases of osteo-malacia with extract of supra-renal gland, and obtained

not only improvement, but true clinical recovery. These results suggested the use of supra-renal extract to avoid osseous deformities, especially of the pelvis, which are observed in infancy from rachitism; and this treatment was observed to give favorable results. Other workers afterwards took it up with success. Jovane and Pace, in Naples, and Mauro Greco, in Jemma, came to the conclusion that supra-renal treatment improved the nutrition of rachitic patients, stopped the osseous pains and the gastro-enteric disturbances, caused the disappearance of the softening of the tissues, and favored walking. Luzzatti, in Concetti, also administered tabloids of supra-renal extract, and was satisfied with the result.

According to another theory, rachitism depends upon insufficiency of the thyroid gland. The substance elaborated by this gland may have a stimulant action upon growth in general, and particularly upon the growth of the bones. In congenital myxœdema, there is an arrest in the development of these, and ossification remains stationary. Hofmeister has demonstrated that the same thing also occurs in young animals in consequence of extirpation of the thyroids. Quite the contrary occurs in hyperthyroidism, where the growth of the skeleton is accelerated. On the other hand, Hertoghe reports good results from the thyroid treatment of rachitism. But other observations have proved that this treatment is of use only when the rachitism is associated with hypo-thyroidism; in these cases the general nutrition improves and growth recommences.

Others have suspected a relation between the pituitary gland and rachitism. The physiological importance of the pituitary gland has been much studied, first by physiologists, then by clinicians. Extirpation of the pituitary gland, especially in young animals, causes arrest of development and disturbances of dentition, the osseous system, and metabolism. It appears that the action of pituitary extract consists in improving the utilization of the mineral salts which reënforce the organism, and in diminishing their elimination. Pituitary extract may stimulate these processes in rachitic patients, granting that hypo-function of the pituitary gland exists in them.

All the organs of internal secretion represent so many forces linked together in a long and intricate chain which governs the formative and protective rhythm of the organism. Thus it may be believed that rachitism has a polyglandular pathogeny.—(La Clinica Veterinaria.) W. R. C. *Vet. Rec.*

CONJUNCTIVITIS AND COLLYRIA.

G. MAYALL, M. R. C. V. S., Bolton.

Conjunctivitis of the catarrhal form is very common in dogs. It seems to be more frequent amongst them when they live in damp industrial regions than when they pass their lives in the purer air of country districts. In towns we seem to notice its greater frequency in dogs of small stature, such as Scottish terriers, Yorkshire terriers, bull dogs, fox terriers, etc., than in bigger dogs (i. e., dogs whose eyes are situated at a higher level from the ground), such as greyhounds, St. Bernards, mastiffs, retrievers, etc. The instances of bronchitis and catarrh in dogs, too, seem to be more frequent in the smaller breeds of dogs than in the larger ones. It has often seemed to us that one strong reason for this is the exposure of the eyes to a greater amount of bad vapors and contaminated air at a low level from the ground. The currents of cold air are stronger and keener close to the ground, the lower air strata are more heavily charged with dust, sand and irritant gases than those higher up and both lungs and eyes in small-statured dogs are in a more favorable position to receive the fullest dose of any injurious influences, so they become most frequently affected.

Apart from catarrhal conditions of the conjunctiva associated with distemper, eczema of the eyelids, mange, etc., we get many cases of what appear to be uncomplicated and simple catarrhal conjunctivitis. Frequently these subjects recover after a varying period, but now and then we get some frightfully obstinate cases to deal with. Fortunately, the majority of dog clients are of the class that used to keep carriage horses in days gone by, or of the better middle class, and as a rule they are reasonable, can afford to pay, do not expect lightning results, but are willing to leave dogs with us until cure or marked benefit results. The slowness of progress of a case, however, frequently dissatisfies the veterinary surgeon. One day he comes round his dog cases and finds a patient with a clearish eye and conjunctiva and the next it is filled with catarrhal discharge as profuse as when the original treatment of the dog began. The keeping of the dog's abode clean and free from draught has been strictly observed, but the disease still varies in its exacerbations and tests all the skill and knowledge of the veterinarian to defeat it. We have kept note of some half-dozen cases we have recently

treated, and think the periods of time occupied in cure and a statement of the collyria used may be interesting. The worst case as regards trouble and duration of treatment was in a Scottish terrier. Here the period taken up in treatment was eight weeks and the collyria used were boric acid, grs. xx, zinc sulph. gr. I, water an ounce, and later on peroxide of hydrogen solution and 5 per cent protargol solution. The lotions were applied by means of a syringe two or three times daily. A bull dog and a Pekinese took three weeks to cure with lotions of boric acid and zinc sulph. and adrenalin and alum lotion (5 grs. to the ounce of water) and protargol solution respectively.

A second Scottish terrier in a bad way from conjunctivitis, mange and oral sepsis was cured by means of scaling the teeth, cleaning the mouth with powdered charcoal, the administration of Parrish's chemical food and treatment of the conjunctivitis with 1 in 5,000 increased in strength to 1 in 4,000 corrosive sublimate solution applied warm twice daily. The conjunctivitis here was cured in ten days, and although very formidable at first the result was gratifying. A fifth dog, an Airedale, operated on under quinine and urea hydrochloride injections and chloroform anæsthesia for a large post-pharyngeal abscess was also suffering badly from catarrhal conjunctivitis which was cured in a week with corrosive sublimate collyria. A word of caution must be given in the use of this collyrium; if much of it moistens the eyelids externally it seems to denude them of hair, and it is wise to smear vaseline on the lids externally to protect them from the action of the lotion.

A sixth dog, a black Spaniel, took well over three weeks to set right with boric lotion and argyrol.

The results of these few cases seem to show that the quickest and most satisfactory results can be secured with corrosive sublimate lotion and we intend in future to use them largely. Where there are corneal ulcers or opacities they seem to have a beneficial effect on these complications.—*Vet. Jour.*

Dr. Thomas B. Rogers of Woodbury, New Jersey, has been a practitioner in southwestern New Jersey for forty years. He graduated at the American Veterinary College with the class of 1879. Though closely approaching the three score and ten, he has all the vigor and interest of a man of fifty. A year ago he returned to his Alma Mater as professor of veterinary therapeutics.

POLO TEAM OF VETERINARY TRAINING SCHOOL, CAMP LEE, VA.
Believed to Be the First Polo Team Ever Organized in the United States Composed Entirely of Veterinarians.

From left to right: Lieut. Col. Griffin, instructor; Captain Smith; Captain Muldoon, captain of the team; Captain Haring, Captain Hardenbergh, Captain Mackie.

ARMY VETERINARY SERVICE.

THE CAMP LEE POLO TEAM.

Owing to an unfortunate omission, the personnel of the polo team appeared incorrectly in the May issue of the Journal. We are, therefore, reproducing the illustration with the names of the members of the team correctly stated, and Captain Muldoon mentioned in his proper place as captain of the team.

FROM THE OFFICE OF THE SURGEON-GENERAL OF THE ARMY, WASHINGTON, D. C.

VETERINARY TRAINING SCHOOLS.

The Veterinary Corps organized three training schools for its personnel during this war—one for enlisted men at the Medical Officers' Training Camp, Fort Riley, Kansas; one for officers at Camp Greenleaf, Ga., where enlisted men were also trained, and one for organizing, equipping and training of veterinary units for overseas service at Camp Lee, Va.

The school at Fort Riley, Kansas, was established February 4, 1918, by Major Robert J. Foster, V. C. At that time authority had been given to allow men to enlist in the Veterinary Corps who were under and over the draft age. Practically all men who enlisted west of the Mississippi River were sent to Fort Riley for training. This school was in operation from February until September, 1918, and 540 men were trained, most of whom were sent to Camp Lee for overseas service.

The school at Camp Greenleaf was established by Major D. S. White (later Colonel), and it was contemplated to train there both officers and enlisted men. Major W. J. Stokes, V. C., assumed command of this school in March. At the time the armistice was signed, about 200 enlisted men had been trained; approxiately 490 officers had been graduated; 240 officers were in training, and 655 enlisted Medical Reserve Corps men (graduate veterinarians) had reported for duty, of whom 86 had been commissioned and the rest were candidates for commissions.

The training school at Camp Lee, Va., was organized in April, 1918, with the purpose in view of organizing, equipping and training oversea units.

Everyone must bear in mind the fact that the Veterinary Corps as a military organization was entirely new and was developed during the stress of war days, when haste meant everything. Everybody had to go forward, not backward, and if mistakes were made, there was no time to stop, but to move on with definite objects in view.

From the beginning of the Camp Lee school it was called upon to exceed its estimated capacity to send units overseas. The object of this school, as has been stated, was to organize, equip and train veterinary units for overseas service. At the time the armistice was signed, there was a schedule prepared for the shipment of overseas units to include June 30, 1919.

The Veterinary Corps had to provide officers for these units and had to have a constant supply to officer the units to be organized as fast as men were supplied from the draft. There was not an abundance of veterinary officers to fill this want. It was also found necessary to send officers overseas with either hospital or replacement units only.

The demand made for veterinary units by the War Department was of course known to the Veterinary Division, Surgeon General's Office, and on this plan the organization of units was worked out. To some officers it might have seemed a waste of time to be kept at Camp Lee and not be sent overseas immediately, but the pleasure of a few individuals could not be considered when it involved schedules affecting thousands of men.

It must also be kept in mind that the Veterinary Corps prior to the war consisted of less than 75 officers who had seen service of line organizations. Then, these officers had never had any regular military training. It was only what each individual had picked up for himself that marked his ability in purely military affairs. Many of these officers had been sent overseas and were not available for assignment to this school. When the establishment of the school was authorized by the General Staff, it was decided that it would be necessary to send line officers to the school as instructors until such time as the Veterinary Corps could supply the necessary trained officers. There was no other alternative.

Lieutenant Colonel Gerald E. Griffin, V. C., was probably the most experienced man in the regular army veterinary corps, and he was made senior instructor, with the idea of his eventually being made Commandant. Veterinary officers were placed as understudies to other line officers on duty, and, had the school not

been broken up by the armistice, all line officers would undoubtedly have been relieved shortly and their places taken by the veterinary officers acting as understudies.

The Camp Lee Veterinary Training School was in active operation from April 12, 1918, to November 11, 1918, and during that time a total of 393 officers and 7,968 enlisted men passed through the school. There were organized, equipped, trained and sent to France 15 veterinary hospitals (Nos. 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20 and 21), each consisting of 7 veterinary officers and 300 enlisted men; 1 base veterinary hospital of 4 officers and 144 enlisted men; 6 Corps Mobile Veterinary Hospitals of 2 officers and 35 enlisted men each; 3 Army Mobile Veterinary Hospitals of 4 officers and 144 men each, and 4 Veterinary Replacement Units of 13 officers and 200 men each.

There were organized, equipped and trained ready for oversea service, when the signing of the armistice caused all shipments to stop, 3 veterinary hospitals, 1 base veterinary hospital, 1 corps mobile veterinary hospital, with personnel similar to units above mentioned, and 1 veterinary replacement unit, consisting of 40 officers and 200 men. There was also in process of organization at this time, but not completed, 5 veterinary hospitals, 5 corps mobile veterinary hospitals and 2 veterinary replacement units. Starting with absolutely nothing—not even a building—this record is not to be despised, even though a few individuals were not pleased. There was time only, under this extreme emergency, to consider units, organizations and results obtained as a whole and not by individuals.

It would be an unpardonable mistake were the Veterinary Corps not to profit by the experience gained in these schools. It is believed that the Corps will be able to use to the utmost advantage the experience gained in conducting these schools in any system of instruction that may be established in the future.

It may be of interest here to outline the plan for schools proposed in the reorganization of the Army Veterinary Service.

Candidates entering the Army Service hereafter will be given a year's training before being assigned to duty with troops. After passing the prescribed physical and professional examination, they will be commissioned as 1st lieutenants, Veterinary Reserve Corps. The training will be divided into a post-graduate theoretical course at the Veterinary Department, Army Medical School, Washington, D. C., followed by a practical course at a

veterinary training center, yet to be decided upon. Each course will be from five to six months in length.

The theoretical course at the Army Medical School is planned to provide instruction in veterinary bacteriology and pathology; diagnostic and biologic laboratory methods; meat and milk hygiene; military veterinary medicine, with special attention to communicable and parasitic diseases; military veterinary hygiene, and regional surgery. Research work in animal diseases will also be undertaken here, where the opportunities for laboratory work will be unexcelled.

Officers who successfully complete the theoretical course at the Army Medical School will immediately be assigned to the practical veterinary training school to complete their training.

The practical veterinary training center will have to be conducted at a post or camp where a very large mounted command is located and a general veterinary hospital can be maintained to provide enough clinical material for teaching purposes. Here, it is also contemplated to teach enlisted men in the special branches needed for the veterinary service.

For officers, the practical training will consist of instruction in veterinary hospital administration, equipment and duties (including veterinary evacuation companies and veterinary evacuation hospital); surgical and medical clinics; communicable diseases—handling of, diagnosis of, etc.; horseshoeing instruction (practical and lectures); equitation; equipment of military animals (cavalry, field artillery, draft and pack animals, including instruction in packing); conformation; examination for soundness and horse-judging; breeding; military animal management; manual of small arms (pistol); map-reading, and such military training as is necessary.

It must be understood that the courses of training proposed are contingent upon enactment of legislation and reorganization of the veterinary service by Congress as a part of the Army reorganization contemplated. These plans are all in the hands of the General Staff.

The old Veterinary Corps, as it existed at the beginning of the war, consisted of 2 officers for each horsed regiment and 17 officers as inspectors of animals and meats. This limited and inflexible personnel is entirely inadequate. The Corps is now greatly expanded and is functioning along broad general lines, similar to the other closely-related professional branches of the

Medical Department and in general is organized similar to the veterinary services of foreign armies.

The main advantages of the Veterinary Corps of the Army, as now organized, are: 1st—It provides the Army for the first time in its history with a modern, scientific service. 2nd—By demanding the highest professional qualifications of the men entering it and offering adequate inducements in promotion, responsibility commensurate with grade, opportunity for research and original investigation, etc., it will quietly but persistently encourage a raising of the standard of the profession of the entire country. The second reason above stated is a paramount one why every member of the civilian profession, who has the real interests of his science and its advancement at heart, should be a staunch supporter of the Army Veterinary Corps. The Corps can only be as strong as the men who enter it from civil life can make it. There is no reason why it should not present an attractive career to the very best type of young professional men, but the desirable degree of excellence can only be developed by the personnel with the loyal assistance of the great mass of civilians.

Once the Veterinary Corps is soundly established by legislative enactment—a result devoutly hoped for in the near future—the system of instruction as described above can go forward and develop along the general lines laid down for it.

VETERINARY CORPS COMMENDED BY GENERAL PERSHING.

The Commander in Chief, American Expeditionary Forces, France, has recently commended the veterinary service through the Chief Veterinarian, Office of the Chief Surgeon, A. E. F., and expressed his appreciation as follows:

"Now that active operations have ceased, it gives me a great deal of pleasure to express my thanks, in the name of the American Expeditionary Forces, to the officers and men of the Veterinary Corps, for their efforts and accomplishments during the war.

Starting as you did, with insufficient personnel, and laboring under severe handicaps, you nevertheless have overcome many obstacles and achieved results.

The care of our animals was one of the most important duties in the American Expeditionary Forces. It required skill, foresight, patience and perseverance. You and your predecessors had

successfully created an organization for care and supply of animals that is a credit to our Army.

It is indeed praiseworthy that the efforts of all did not cease at caring for and fulfilling demands for animals. Your zeal happily led you into research work and as a result, you have made many valuable discoveries concerning the nature of and cures for equine diseases. That by itself will be a lasting monument commemorating your unselfish and patriotic labor."

PROMOTIONS.

The Army and Navy Journal of April 12, 1919, contained a column editorial on the subject of "Temporary Promotions in the United States Army." The subject of promotions is one that has caused more conjecture and worry than any other one thing connected with the organization of our large armies during this war.

Promotions for the regular army have always been and are now by seniority. However, with the passage of the Selective Service Act of May 18, 1917, promotions in the forces organized under that act were to be made by selection without regard to seniority. With the organization of the American Expeditionary Force, France, the situation was further complicated. The Commanding General, France, was given complete control over the promotions of all officers therein without regard to the War Department, Washington. The promotions were made in France and then the War Department notified that such officers were promoted, the promotions confirmed in Washington and commissions issued accordingly. This condition precluded the possibility of officers who were in France being recommended for promotions by the heads of their respective service in this country. Such a condition brought about so far as promotions were concerned practically two separate armies; one consisting of the American Expeditionary Force and the other, the army in the United States.

It was not until October 4, 1917, that an order was issued by the War Department, organizing the Veterinary Corps for the existing emergency under the authority conferred by Section 2 of the Act approved May 18, 1917. This order stated the number of officers allowed for various grades and provided further that these numbers should not be exceeded except in the grade of 2d lieutenant.

During the first months of the war, and prior to the organization of the veterinary service, commissions were issued for this

corps in the grade of 2d lieutenant only. A large number of these officers were sent to France prior to the organization of the Veterinary Corps above referred to and also before the organization could be put into effect in this country. The Veterinary Corps was no exception in this matter as the same condition prevailed in other branches of the service. The veterinary division, S. G. O., was soon confronted by the following situation. Veterinary officers in France could not be promoted except by approval of the Commanding General, A. E. F. Promotions could not be recommended by the director in Washington. The Corps was enlarging rapidly in this country and promotions had to be made for officers to command units being organized. There was only one solution: to promote men in the United States to the grades authorized for the number of officers on duty; to keep count of the total number of officers in France and hold as vacancies, the grades that number would be entitled to have. This would allow the promotions of our officers in France to the grade permitted according to the strength of the corps on duty there. This was done.

The functioning of the Veterinary Corps in the A. E. F. in accordance with S. R. No. 70, War Department, December 15, 1917, was not accomplished until September, 1918, when Colonel White was made Chief Veterinarian, Office of the Chief Surgeon, A. E. F. Previous to this time, the Corps was operating as a subsidiary organization of the remount service. Such were the prevailing conditions regarding promotions at the time the armistice was signed November 11, 1918. Immediately thereafter, an order was issued by the Secretary of War stopping all promotions from that date. This order in effect practically stopped all recommendations for promotions in the Veterinary Corps in this country that were made after November 1st. About 125 recommendations were returned from the Adjutant General's Office disapproved because of the above order. It might be noted also that all original appointments were stopped at the same time and approximately 150 recommendations for commission failed to receive action. This order stopped the appointment of the enlisted 1918 graduate veterinarians who were at Camp Greenleaf and candidates for commissions.

Probably due to the entirely inadequate previous promotions of the veterinary officers in France, there have been a number of promotions to the grades of 1st Lieutenant, Captain and Major since the armistice was signed. In this country, however, the

ruling of the Secretary of War has been strictly adhered to insofar as the Veterinary Corps is concerned.

On January 25, 1919, an announcement was made by Secretary Baker of the relaxation of the ruling previously made with reference to making no promotions. Such relaxation came as a result of widespread protest against the ban on army promotions announced immediately after the armistice. These promotions were to give rank appropriate to command in case of line officers and to actual employment in the case of staff officers, but promotions were not to be made for past services, however meritorious.

Par. 7, circular 79, reads: "No officer will be recommended for promotion unless the duty upon which he is engaged or to which he is to be assigned be commensurate with the advanced grade recommended and unless there is no officer of appropriate rank reasonably available for assignment to the duty in question, the officer making the recommendation will certify that these conditions are fulfilled." Though recommendations may be submitted as contemplated in circular letter 79, no promotions will be made without the personal approval of the Secretary of War. The memorandum also directs that replies to the following questions in the case of each recommendation be submitted:

(a) Is the promotion to give rank to actual employment?

(b) Is the promotion a reward for past service?

(c) Does the work on which the officer recommended for promotion is to be assigned required in the best interest of the United States, the advanced grade recommended?

(d) Is there any officer of appropriate rank reasonably available for assignment to the duty to which it is proposed to assign the officer recommended for promotion?

In face of these precautionary warnings, in practically every instance the recommendation was disapproved.

On March 31, 1918, a letter from the Chief of Staff reviewed the situation of promotions and closed with this statement "that a Chief of Staff Corps or Department must include in his certificate of recommendation the further statement that the interest of the United States will positively suffer if the promotion is not made." To quote the Army and Navy Journal article of April 12, 1918, which clearly sums up the situation, "On its face, this has every appearance of a stop order on the recommendations invited by circular letter 79 and in the memorandum of March 3, 1919."

The following orders of transfer and reassignment of veterinary officers have been issued during the past month:

1. Major D. J. Lynch, V. C., from A. R. D., Camp McClellan, Ala., to A. R. D., Fort Bliss, Texas, for duty as The Veterinarian.

2. Major Joseph W. Burby, V. C., from Camp Jackson, S. C., to Camp Gordon, Ga., for duty as Camp Veterinarian.

3. Major Wm. P. Hill, V. C., from A. R. D., Camp Meade, Md., to A. R. D., Camp Travis, Texas, for duty as The Veterinarian.

4. Major Harry F. Steele, V. C., R. A., from U. S. Army General Hospital, East View, N. Y., to Fort Sam Houston, Texas, for duty as Assistant to the Department Surgeon, Southern Dept.

1. Captain Gordon B. Huse, V. C., from A. R. D. No. 320, Camp Custer, Mich., to Camp Lee, Va., for duty at the Camp Veterinary Hospital

2. Captain Will C. Griffin, V. C., will report for duty as the Camp Veterinarian, Camp Harry J. Jones, Ariz.

3. Captain Ivan L. Barstow, V. C., from Camp Dix, N. J., to Aberdeen, Md., for duty as The Veterinarian.

1. 1st Lieut. Ion W. Parks, V. C., from Camp MacArthur, Tex., to Ft. Sam Houston, Tex., for duty as Assistant to the Post Veterinarian.

2. 1st Lieut. Fred L. Seevers, V. C., from A. R. D. No. 313, Camp Shelby, Miss., to A. R. D. No. 315, Camp Jackson, S. C., for duty.

3. 1st Lieut. John A. Phillips, V. C., from Camp Dix, N. J., to Ft. McIntosh, Tex., for duty as The Veterinarian, Laredo District.

4. 1st Lieut. Howard W. Wilson, V. C., from A. R. D. No. 317, Camp Pike, Ark., to A. R. D. No. 327, Ft. Sill, Okla., for duty

5. 1st Lieut. Oscar E. Gladfelter, V. C., from A. R. D., Ft. Bliss, Tex., to Chicago, Ill., for instruction in meat inspection.

6. 1st Lieut. Wm. E. Spierling, V. C., from A. R. D. No. 307, Camp Wadsworth, S. C., to Field Remount Squadron No. 353, Camp Wadsworth, S. C., for duty as The Veterinarian.

7. 1st Lieut. Dennis S. Shannon, V. C., from Camp McClellan, Ala., to Port of Embarkation, Newport News, Va., for duty.

8. 1st Lieut. Clifton G. Crumpacker, V. C., from A. R. D. No. 309, Camp McClellan, Ala., to Ft. Reno, Okla., for duty as Assistant Veterinarian.

9. 1st Lieut. Chester L. Nelson, V. C., from A. R. D. No. 309, Camp McClellan, Ala., to A. R. D. No. 329, Camp Travis, Tex., for duty.

10. 1st Lieut. Charles E. Richardson, V. C., from A. R. D. No. 309, Camp McClellan, Ala., to A. R. D. No. 329, Camp Travis, Tex., for duty.

11. 1st Lieut. William S. Ford, V. C., from Camp Dix, N. J., to Garden City, L. I., N. Y., for duty as C. V., Air Service Depot, that place.

12. 1st Lieut. Samuel H. Saul, V. C., has been relieved from duty as Assistant to the Dept. Surgeon, Panama Canal Zone, and directed to proceed to his home and return to the retired list.

13. 1st Lieut. Earl P. Gordon, V. C., from Camp Dix, N. J., to Fort Riley, Kansas, for duty at the Mounted Service School.

14. 1st Lieut. John K. McConeghy, V. C., from Aberdeen, Md., to San Francisco, Calif., thence to Vladivostok for duty with the American Expeditionary Forces, Siberia.

15. 1st Lieut. Harry Dixon, Jr., from A. R. D., Camp MacArthur, Texas, to San Francisco, Calif., thence to Vladivostok for duty with the American Expeditionary Forces, Siberia.

16. 1st Lieut. George H. Seaver, V. C., from Camp Lewis, Wash., to A. R. D., Camp Kearny, Calif., for duty.

17. 1st Lieut. F. B. Croll, V. C., from A. R. D., Camp Dodge, Iowa, to A. R. D., Camp Funston, Kan., for duty.

18. 1st Lieut. Fred L. Baer, V. C., from A. R. D., Camp Sheridan, Alabama, to A. R. D., Camp Travis, Texas, for duty.

19. 1st Lieut. S. W. Stokes, V. C., from Camp Grant, Ill., to A. R. D., Camp Grant, Ill., for duty.

20. 1st Lieut. George S. Place, V. C., from duty at Port of Embarkation, Newport News, Va., to A. R. D., Fort Sill, Oklahoma, for duty.

1. 2nd Lieut. Emil E. Weller, V. C., from A. R. D. No. 329, Camp Travis, Tex., to Camp Travis, Tex., as Assistant to the C. V.

2. 2nd Lieut. Robert H. Campbell, V. C., from Camp Dix, N. J., to A. R. D. No. 329, Camp Travis, Tex., for duty.

3. 2nd Lieut. Harry L. Watson, V. C., from A. R. D. No. 313, Camp Shelby, Miss., to A. R. D. No. 315, Camp Jackson, S. C., for duty.

4. 2nd Lieut. Harry I. Stanton, V. C., from A. R. D. No. 309, Camp McClellan, Ala., to Douglas, Ariz., for duty with the 1st Cavalry.

5. 2nd Lieut. Harry C. Fullington, V. C., from A. R. D. No. 316, Camp Gordon, Ga., to Camp Bowie for duty as Assistant to the C. V.

6. 2nd Lieut. Warren R. Sheff, V. C., from Camp Dix, N. J., to the Canal Zone, Panama Canal Department, for duty.

7. 2nd Lieut. Noah J. Elder, V. C., from A. R. D. No. 305, Camp Lee, Va., to Camp Bragg, Fayetteville, N. C., for duty as Assistant to the C. V.

8. 2nd Lieut. A. E. Joseph, V. C., from Camp Dix, N. J., to Fort Warren, Mass., for duty as The Veterinarian in the Coast Defenses of Boston.

9. 2nd Lieut. L. T. Nagel, V. C., from Port of Embarkation, Newport News, Va., to North Charleston, S. C., for duty.

10. 2nd Lieut. Wm. A. Martin, V. C., from A. R. D., Camp Sheridan, Ala., to Fort Bliss, Texas, for duty with the 82nd F. A.

11. 2nd Lieut. W. F. Ridley, V. C., from Camp Dix, N. J., to A. R. D., Camp Devens, Mass., for duty.

The following officers have been honorably discharged from the Veterinary Corps, United States Army:

1. Major E. B. Ackerman, U. S. A., who was on duty as The Veterinarian, Camp McClellan, Ala.

2. Major John H. Blattenberg, U. S. A., who recently returned from duty with the American Expeditionary Forces, France.

3. Major Harry W. Brown, who has just returned from services overseas.

4. Major R. M. Staley, who has been acting as General Veterinary Inspector for the Southern Department.

1. Captain V. F. Pruden, who was on duty as Camp Veterinarian, Camp Hancock, Ga.

2. Captain R. H. Sewell, who was on duty as Camp Veterinarian, Camp Travis, Tex.

3. Captain C. H. Hoffmire, who recently returned from the American Expeditionary Forces, France, where he was on duty with Veterinary Hospital No. 6.

4. Captain N. B. Giles, who was on duty at the A. R. D., Camp Beauregard, La.

5. Captain Wm. A. Bright, who was on duty as Camp Veterinarian, Camp Sheridan, Ala.

6. Captain R. E. Kyner, who recently returned from duty with the American Expeditionary Forces, France.

7. Captain G. E. Bartholomees, who was on duty as Camp Veterinarian, Camp Beauregard, La.

8. Captain T. B. Hinkle, who was on duty at A. R. D. No. 329, Camp Travis, Tex.

9. Captain C. F. Henry, who was on duty as Zone Veterinarian, Kansas City, Mo.

10. Captain Ralph M. Bell, who was on duty as The Veterinarian, A. R. D. No. 304, Camp Meade, Maryland.

11. Captain William E. Muldoon, who was on duty at the Camp Veterinary Hospital, Camp Lee, Va.

12. Captain Omar T. Atwood, who has recently returned from the American Expeditionary Forces.

13. Captain Thomas J. Quinn, who has recently been on duty with the American Expeditionary Forces.

The following 1st Lieutenants, V. C., U. S. A., have been honorably discharged during the past month:

1st Lt. N. A. Roettiger
1st Lt. P. J. Creedon
1st Lt. C. H. Wight
1st Lt. L. C. Martin
1st Lt. R. W. McKibbin
1st Lt. E. D. King, Jr.
1st Lt. J. B. McClellan
1st Lt. O. M. Webb
1st Lt. R. L. South
1st Lt. L. W. McElyea
1st Lt. J. F. Jansen
1st Lt. Jay E. Nixon
1st Lt. C. T. Chamberlain
1st Lt. C. B. Lenker
1st Lt. W. J. Schimmel
1st Lt. A. T. Cornell
1st Lt. V. C. Bartlett
1st Lt. Will W. Korb
1st Lt. F. W. Graves
1st Lt. A. C. Morrow
1st Lt. L. W. Rowles
1st Lt. J. C. Hoover
1st Lt. E. M. Hough
1st Lt. E. J. Watters
1st Lt. Edw. M. Lynn
1st Lt. Darrell E. Trump
1st Lt. Howard W. Naylor
1st Lt. F. J. Scheloski
1st Lt. F. E. Kunze
1st Lt. J. A. Tognotti
1st Lt. E. S. Carter
1st Lt. John N. Egan
1st Lt. Emory E. Hobson
1st Lt. Geo. J. Goubeaud
1st Lt. Oliver A. Taylor
1st Lt. E. H. Lenheim
1st Lt. R. B. Jones

The death of 1st Lieut. J. D. Lee, V. C., N. A., who was on duty with the American Expeditionary Forces in France, has been reported. He was suffering from broncho-pneumonia.

The following 2nd Lieutenants, V. C., U. S. A., have been honorably discharged during the past month:

2nd Lt. S. Yetter
2nd Lt. J. S. Dick
2nd Lt. E. D. Harris
2nd Lt. R. E. Libby
2nd Lt. H. B. Weeden
2nd Lt. A. H. Kerr
2nd Lt. Geo. D. Anderson
2nd Lt. E. W. Pierce
2nd Lt. E. Bruce
2nd Lt. L. A. Huseby
2nd Lt. E. E. Watson
2nd Lt. H. F. Walker
2nd Lt. W. H. McKahan
2nd Lt. C. E. Wood
2nd Lt. J. C. Mitchell
2nd Lt. L. V. Walker
2nd Lt. Clarence L. Young
2nd Lt. F. M. Nelson
2nd Lt. E. C. Reither
2nd Lt. G. J. Lengerich
2nd Lt. J. E. Randall
2nd Lt. W. J. Kiff
2nd Lt. Wm. H. Shannon
2nd Lt. G. H. Starr
2nd Lt. W. N. Timblin
2nd Lt. E. A. McCain
2nd Lt. F. F. Rosenthal
2nd Lt. H. W. Schirmer
2nd Lt. Richard I. Kerley
2nd Lt. E. C. Baker
2nd Lt. J. R. Barnes
2nd Lt. J. H. Kitzhofer
2nd Lt. C. E. Freeman
2nd Lt. R. B. Whitesell
2nd Lt. Karl A. Trish
2nd Lt. A. G. Frees
2nd Lt. H. V. Cardona
2nd Lt. F. Edwards
2nd Lt. G. C. Greene
2nd Lt. J. A. Flinn
2nd Lt. J. M. Herron
2nd Lt. E. Kernohan
2nd Lt. D. W. Wright
2nd Lt. P. E. Phillips
2nd Lt. A. M. Stark
2nd Lt. E. M. Ogram
2nd Lt. R. H. Gittins
2nd Lt. Joseph H. Stephens
2nd Lt. John F. Rock
2nd Lt. S. P. Ragan
2nd Lt. Wm. J. Cozad
2nd Lt. James L. Sanders
2nd Lt. Edw. A. Cholvin
2nd Lt. Herbert T. Cook
2nd Lt. Charles S. Babcock
2nd Lt. E. W. Kern
2nd Lt. E. B. Jordan
2nd Lt. J. E. Reedy
2nd Lt. T. L. Knapstein
2nd Lt. W. A. Hahn
2nd Lt. T. V. Ward
2nd Lt. Howard F. Roberts
2nd Lt. J. W. Boylston
2nd Lt. W. E. Fritz
2nd Lt. G. Smith, Jr.
2nd Lt. John S. Nicholas
2nd Lt. Leland G. Dassance
2nd Lt. Harry H. Owen

The following veterinarians, with the rank of Captain in the Veterinary Corps, Regular Army, have been restored to the rank of Major in the Veterinary Corps, Regular Army, as a result of the decision of the Comptroller of April 9, 1919:

1. Frederick Foster.
2. Gerald E. Griffin.
3. Charles D. McMurdo.
4. William G. Turner.
5. William V. Lusk.
6. Olof Schwartzkopf.
7. Joseph R. Jefferis.
8. Harry F. Steele.

OFFICERS, VETERINARY CORPS, UNITED STATES ARMY.

	On Duty April 11, 1919.	On Duty May 11, 1919
Colonels	0	0
Lieutenant Colonels	2	2
Majors	78	75
Captains	182	173
First Lieutenants	487	462
Second Lieutenants	555	503
	1304	1215

Major John H. Gould, V. C., who was Chief Veterinarian, second army, from December 1st, 1918, to April 15th, 1919, when this army was officially disbanded, has been transferred as Chief Veterinarian to the third army with station at Army Headquarters, Coblenz, Germany.

Major Harold E. Bemis, V. C., who has been Chief Veterinarian, third army, is to be ordered to the United States for discharge.

Major Walter Fraser, V. C., who has been on duty with General Headquarters, Chaumont, France, has been relieved and made Assistant Chief Veterinarian, Advance Zone, relieving Major Reuben Hilty, who has been ordered to the United States.

The following officers, now serving with the Veterinary Corps, American Expeditionary Forces, have been promoted to the grades noted:

1st Lieutenant to Captain.

1. Raymond Randall.
2. Michael Donahoe.
3. Charles P. Bishop.
4. George E. Butin.

2nd Lieutenant to 1st Lieutenant.

1. Emory W. Tolley.

Dr. J. C. Corlies of Newark, New Jersey, who graduated in 1876, nearly forty-five years ago, still remains active and vigorous and deeply interested in every humane aspect of his profession. When recently appealed to to honor his State in the field of veterinary medicine he became a prompt contributor to the laudable undertaking of establishing a state scholarship.

ASSOCIATION NEWS.

AMERICAN VETERINARY MEDICAL ASSOCIATION.

COMMITTEE APPOINTMENT BY THE PRESIDENT.

Major C. B. McMurdo has resigned from the Committee on Veterinary History of the American Veterinary Medical Association, as he was unable to give the necessary time and attention to the committee work. President V. A. Moore has appointed Major A. L. Mason of the army to succeed Major McMurdo on this committee. N. S. Mayo.

SECRETARY'S OFFICE.

Recently letters have been sent to all Resident Secretaries of the A. V. M. A., advising them definitely of the date of the New Orleans meeting and urging them to canvass the profession in their state for new A. V. M. A. members and also to assist in securing brief, practical papers for the program, as well as articles and news notes for the Journal. Most of the Secretaries are responding promptly to the appeal.

Letters have also been sent to more than a hundred and fifty applicants who filled out application blanks at Camp Greenleaf last fall but who had not sent in any remittance with their applications. These applications were secured by Captains Longley, Lambert, McGuire, Hickman and others. Practically all of these veterinarians have been discharged from the service and many of them are sending in the necessary remittance to go with the application. Just as soon as the remittance is received their names are sent to the editor and their subscriptions to the Journal are started.

President V. A. Moore has appointed Dr. C. E. Swail of Colebrook, New Hampshire, as Resident Secretary of that state to succeed Dr. Farmer, who has removed from the state.

Dr. G. A. Roberts, professor of veterinary science at the North Carolina Agricultural and Mechanical College at West Raleigh, has resigned as Resident Secretary of North Carolina. Dr. Roberts is going to Sao Paulo, Brazil, for the International Health Board, Rockefeller Foundation, to be with the laboratory

of hygiene, Sao Paulo Medical School. He expects to leave for South America about June 1. Dr. Roberts is one of the "live wires" in the veterinary profession in the southern states and he will be greatly missed.

A meeting was called by President Dunphy in Chicago on May 5 to plan for the program of the United States Live Stock Sanitary Association meeting the first of next December. Those present were Drs. Geo. Dunphy, D. M. Campbell, J. I. Gibson, N. S. Mayo, and Mr. H. R. Smith. Plans were outlined for this meeting and it is believed the program will be excellent. The meeting will be held on December 1, 2 and 3, 1919, Chicago. This is also the week of the International Live Stock Exposition.

N. S. MAYO.

DISTANCES FROM VARIOUS CITIES TO NEW ORLEANS, THE CONVENTION CITY.

In this issue of the Journal the writer has endeavored to submit some correct mileage data which may serve as a guide to those contemplating a visit to the next meeting of the American Veterinary Medical Association in New Orleans, Louisiana, from November 17 to 21, inclusive. In this announcement, the information is taken from various railroad folders; therefore, much dependence can be placed upon the figures.

The most distant city in the States appears to be Seattle, Washington, but this should, in no way, discourage a member from attending. On the other hand, a decision on the part of any veterinarian to journey 3,500 miles to the meeting in New Orleans will be a benefit to himself in four ways, notably, an observation trip; a splendid opportunity to see one of the most unique and interesting cities in America; the educational feature of the Association; and last but not least, a vacation at the close of the year, from the cares of the snow shovel to the music of the lawn mower.

Atlanta, Ga.	To New Orleans	493
Boston, Mass.	To New Orleans	1,375
Bristol, Va.	To New Orleans	739
Buffalo, N. Y.	To New Orleans	1,279
Butte, Mont.	To New Orleans	3,183
Chattanooga, Tenn.	To New Orleans	498
Chicago, Ill.	To New Orleans	930

Cincinnati, Ohio	To New Orleans	835
Cleveland, Ohio	To New Orleans	1,098
Dallas, Texas	To New Orleans	515
Denver, Colo.	To New Orleans	1,527
Des Moines, Iowa	To New Orleans	1,291
Detroit, Mich.	To New Orleans	1,172
El Paso, Texas	To New Orleans	1,161
Indianapolis, Ind.	To New Orleans	909
Jacksonville, Fla.	To New Orleans	612
Kansas City, Mo.	To New Orleans	887
Los Angeles, Cal.	To New Orleans	2,003
Louisville, Ky.	To New Orleans	787
Memphis, Tenn.	To New Orleans	456
Milwaukee, Wis.	To New Orleans	1,060
Minneapolis, Minn.	To New Orleans	1,338
New York, N. Y.	To New Orleans	1,252
Omaha, Neb.	To New Orleans	1,417
Philadelphia, Pa.	To New Orleans	1,191
Phoenix, Ariz.	To New Orleans	1,628
Portland, Me.	To New Orleans	1,484
Portland, Ore.	To New Orleans	3,259
Salt Lake City, Utah	To New Orleans	2,786
San Francisco, Calif.	To New Orleans	2,487
Seattle, Wash.	To New Orleans	3,442
St. Louis, Mo.	To New Orleans	718
Toronto, Canada	To New Orleans	1,380
Washington, D. C.	To New Orleans	1,117

The following well-equipped railroads enter the city of New Orleans, using three separate depots:

Illinois Central—From Chicago, St. Louis, Mo., Louisville, Ky., and Memphis, Tenn.

Louisville & Nashville—From Cincinnati, Ohio; Louisville, Ky.; New York; Atlanta, Ga.; and Birmingham, Ala.

Louisiana Railway & Navigation Company—From Shreveport and Alexandria, La.

New Orleans & Great Northern—From Jackson, Miss.

New Orleans & Northeastern (inlet for the Southern Railway System)—From New York; Washington, D. C.; Philadelphia, Pa.; Cincinnati, Ohio; Chattanooga, Tenn.; Greensboro, N. C.; and Atlanta, Ga.

New Orleans, Texas & Mexico (Frisco Lines)—From San Francisco, Calif.; El Paso, San Antonio and Houston, Texas; and Baton Rouge, La.

Southern Pacific—From Los Angeles, Calif.; El Paso, San Antonio, Texas.

Texas & Pacific—From El Paso, Fort Worth, and Dallas, Texas; and Shreveport and Alexandria, La.

Yazoo & Mississippi Valley—From Memphis, Tenn.; Vicksburg, Miss.; and Baton Rouge, La.

In connection with this meeting negotiations are now pending to provide reduced fares for the trip, the results of which will appear in an early number of the Journal.

E. I. Smith,
Secretary-Treasurer and Chairman Arrangements,
Louisiana Veterinary Medical Association.

SOUTH DAKOTA LIVE STOCK SANITARY BOARD TO MEET IN JUNE.

The regular meeting of the State Live Stock Sanitary Board of South Dakota, which includes the Board of Veterinary Medical Examiners, will be held on the last Tuesday in June at the offices of the Board, Pierre, South Dakota. At this time examinations will be held for license to practice in the state.

The requirements are that diploma be submitted from a recognized veterinary college, for verification, that a fee of $10.00 be paid and that applicant pass an examination before the Board, which examination includes only such subjects as are taught in the curricula of veterinary colleges recognized by the said Board.

A. E. Beaumont, Secretary.

DARWIN AND THE MULE.

Charles Darwin, the distinguished scientist, paid this fine, and just, tribute to the too often maligned mule:

"He always appears to be a most surprising animal. That a hybrid should possess more reason, memory, obstinacy, social affection, and powers of muscular endurance than either of its parents seems to indicate that art has here outmastered nature."

This testimony is supported by all the intelligent men we have ever met who really knew the mule.—Ex.

OTHER ASSOCIATIONS

CHICAGO VETERINARY MEDICAL ASSOCIATION.

The monthly meeting of this association was held at the Great Northern Hotel on April 8. Dr. Mayo gave a brief account of the Chemical Foundation, organized to manufacture medicinal preparations and dyes under German patents that had been taken over by the United States Government.

The Chemical Foundation is capitalized at $500,000 and has purchased from the United States Government German patents to the amount of $250,000. A number of patents are still held by the United States Government and various manufacturers have been licensed to manufacture medicinal preparations under these patents. At the present time the output of Barbital (Veronal) by American manufacturers is approximately one ton per month.

The Chemical Foundation was not organized as a profit-making venture. The returns after deducting six per cent are to be used for research work along medicinal and chemical lines.

The question of giving a full dose of arecoline in the early stages of laminitis in horses as first advocated by Frohner was discussed. It was the general opinion that excellent results were obtained if the laminitis was not traumatic and if the arecoline was administered in the early stages of the disease. Cold packs to the feet were also considered valuable.

A lively discussion followed as to the cause of most cases of acute laminitis. The prevailing opinion was that most cases were due to the formation of toxins in the intestinal tract and quick elimination followed by intestinal antiseptics gave excellent results as a treatment.

A demonstration was also given of a small and inexpensive apparatus for vaporizing iodine crystals and blowing the vapor into cavities where the antiseptic action of iodine was desired.

The association dscussed the proposed veterinary practice act now before the Illinois legislature and a committee was appointed to investigate some points in the bill not well understood.

N. S. M.

VETERINARY MEDICAL ASSOCIATION OF NEW YORK CITY.

APRIL MEETING.

The regular monthly meeting of the Veterinary Medical Association of New York City was called to order in the lecture room of Carnegie Laboratory, 338 East 26th Street, New York City, Wednesday evening, April 2, at 8 : 30 o'clock., by President Cochran.

The minutes of the March meeting were read and approved.

Dr. Adolph Eichhorn, Pearl River, New York, read a most interesting and valuable paper on pre-war meat inspection and sanitary conditions of public abattoirs in various countries in Europe. The Doctor gave a clear-cut description of the abattoirs of France, Germany and Austria-Hungary, his paper being thoroughly enjoyed by the members and afterwards discussed in a very interesting way.

Dr. Eichhorn was followed by Dr. Harry Ticehurst, Morsemere, New Jersey, with a well-written paper on necrobacillosis in the army horses and mules. The Doctor stated that this disease was the greatest menace the army veterinarian had to deal with. He attributed the cause to the assembly of large numbers of animals in comparatively small areas with poor sanitation, the animals standing in mud and manure. The disease was more severe in the remounts than at the training camps, due to better sanitary conditions at the latter. The treatment which proved most efficacious is the applying over the whole affected part a paste made by mixing equal parts of zinc sulphate and lead acetate with a little water. Ten per cent silver nitrate solution was also found to be very effectual when applied twice daily. The chief seat of infection was generally the frog, and if not attended to promptly the disease spread rapidly to the laminæ, coronary band, fetlocks and pasterns. Such cases frequently developed a general infection with septicemia following. The Doctor augmented his paper with records of a number of cases that came under his notice when in the army service, stating that he had records of over three hundred cases of infected frogs which were removed and treated and quick recoveries made. In the second week in February, 1918, out of 6,000 animals in the remount station at that time, 1,743 were in the hospital, and of these 96 per cent were suffering from dermatitis and necro-

bacillosis infection. This paper brought out a good discussion, which was joined in by Drs. Berns, McKinney, Lowe and Dean Hoskins.

Major Ackerman was present and gave an enjoyable talk on his experience in the army service. Dr. Cassius Way, chairman of the Committee on Arrangements for the State Veterinary Medical Association meeting, to be held in Brooklyn this summer, asked the members for their coöperation in making the meeting a success.

Dr. A. J. Allott, 309 West 70th Street, New York City, and Dr. W. H. Hayes, 129 East 75th Street, New York City, were elected to membership in the association.

A vote of thanks was extended to Dr. Eichhorn, Dr. Ticehurst and Major Ackerman for their contributions to the program of the evening.

No further business appearing, the meeting adjourned.

MAY MEETING.

The regular monthly meeting of the Veterinary Medical Association of New York City was held in the lecture room of the Carnegie Laboratory, 338 East 26th Street, New York City, Wednesday evening, May 7, 1919, at 8:30 o'clock, President Cochran in the chair.

The minutes of the April meeting were read and approved.

Dr. Theo. F. Krey of Parke, Davis & Co. introduced a new local anæsthetic, "apothesine." This has been tried out successfully in human practice. It has all the advantages of cocaine, is cheaper and non-toxic, and does not retard healing and escapes the Harrison law. The Doctor gave a sample tube of 2½-grain tablets to the gentlemen present to try out for experimental purposes.

Lieutenant Max Danziger, lately returned from overseas with the 77th Division, was asked by the President to relate some of his experiences in the Army Service. The Lieutenant responded generously and said that at a later meeting he would be better prepared to report.

Captain Charles S. Chase was also called upon, but asked to be excused till a later meeting.

Dr. John F. DeVine, Goshen, New York, gave an instructive address on "Diagnosis of Pregnacy, Sterility, and Abortion." The Doctor cited some interesting cases of diagnosis of pregnancy

which had come under his observation in his extensive cattle practice. The Doctor's address called forth numerous questions from the members, which he answered very fully and satisfactorily.

Under case reports, Dr. R. W. Gannett mentioned having had capital success in treating open and infected tarsal sheath "hock-joint" by cutting the perforans tendon. Dr. R. W. Ellis reported a case of plastic surgery in an English bulldog. This dog had a dislocation of patellar and tarsal joints with adhesions, the leg being badly twisted out of shape. The dog was put under chloroform, the adhesions broken down and the leg and hip joint put in plaster for one month, the result being a capital recovery. The Doctor exhibited two photographs taken before and after treatment. Dr. R. W. Gannett mentioned that the National Geographic Magazine for March contained some excellent photographs of famous champion dogs and that it could be obtained at Hubbard Memorial Hall, Washington, D. C. Dr. C. G. Rohrer reported a case of a Boston terrier bitch which had great difficulty in passing urine. On examination a tumor was discovered directly over the bladder. The Doctor destroyed the bitch and removed the bladder and new growth, which he exhibited at the meeting.

Dr. George H. Berns mentioned the recent death of Dr. McKinney's only son in an airplane accident in Switzerland. The President asked that a rising vote of sympathy be extended to Dr. McKinney in his bereavement, and appointed a committee of three to draft suitable resolutions.

Dr. James W. Flynn, 463 52nd Street, Brooklyn, was unanimously elected to membership in the association.

Dr. R. W. Gannett made a protest against the action of the A. S. P. C. A. ambulances coming and taking horses which are injured on the streets in spite of the protests of the attending veterinarians. It was regularly moved, seconded and carried that the Secretary be instructed to write a letter to the President of the A. S. P. C. A., asking that this practice be modified.

No further business appearing, the meeting adjourned.

J. Elliott Crawford, Secretary.

Lieutenant M. R. Sebright is with the 308th Mobile Veterinary Section and is now stationed at Wengerohr, Germany, A. P. O. 792. He says that mail reaches him after a time and is very welcome.

ASSOCIATION OF STATE AND PROVINCIAL VETERINARY COLLEGES.

REPORTS OF COMMITTEES.

Committee on Curriculum.

The committee appointed by Chairman H. S. Murphey to present to the association at its meeting in Philadelphia facts and data concerning an ideal curriculum wishes to submit the following brief report:

The committee unanimously agree that at the present time it is impossible to properly present this matter to the association for the following stated reasons:

1. The present world war has depleted the faculties of all of the state schools in that they are assisting in various ways with the Veterinary Corps of the National Army. It is worthy of mention that the veterinary colleges have responded as a unit in the present emergency. This has created new duties and responsibilities for those in the service of our country and those left on duty in the various colleges, which has demanded their entire time and attention. Numerous changes and shifts have been made in the faculties to meet this emergency. In view of these added duties and responsibilities, the veterinary faculties have not had time to consider seriously such an important question during the past year.

2. It has been practically impossible to secure data from a number of the schools in the United States, and practically none from the European schools. It is highly desirable to secure information from all of these colleges before such an important piece of work be attempted. The inability to secure this data was no doubt due in a large measure to the changed conditions in the colleges as stated in item 1.

3. Some of the state veterinary colleges have recently made a change in their curricula from three to four years. In these cases it seemed to them desirable to continue on their present curricula for at least another year or two longer before they would be able to decide concerning what changes should be made to constitute the basic principles of an ideal or standard curriculum. In some cases the feeling seemed to prevail that their curricula as they are arranged at present are ideal.

4. The present world war is bringing new problems into veterinary education for solution. The curricula of the colleges

must be changed to meet these newer conditions. In order to establish a standard scheme of education for the veterinarian for the future these educational problems growing out of the present war must be met and the curricula standardized to meet them. It is needless to mention the fact that there is a rapid evolutionary process taking place at present in veterinary education in the United States. All of these facts lead the committee to believe that delay in adopting any particular scheme at present is advisable until conditions in education and those affecting the colleges become more stable.

It is recommended that a committee be appointed to continue the study of this question to be reported at a future meeting of the association. O. V. Brumley, Chairman.

Committee on Teaching Bacteriology.

Bacteriology, as a science, came into existence as a result of the investigations of Pasteur and his co-workers on the cause of fermentation and the etiology of epidemic and epizoötic diseases. The extension of these studies has shown bacteriology to be the great interpreter of many natural phenomena and consequently it has become a many-sided subject. While it is natural, from the origin of the science, to first think of bacteriology in connection with infectious diseases, the truth is that there are numerous and important human activities which depend upon it quite as much as pathology and sanitary science. It is possible, therefore, for one to qualify as a bacteriologist and still be without knowledge of the aims and purposes of this science in a veterinary curriculum.

The formulation of a course of instruction in bacteriology for a veterinary curriculum requires the careful consideration of a number of topics. These pertain to the subject matter, the methods employed in teaching it and the application of the science to practical medicine, surgery and sanitary science. In the time that can be devoted to this subject in a four-year curriculum, it is impossible to follow out details in all instances and consequently emphasis should be placed on fundamental principles governing both the knowledge of the subject and its utilization.

It is essential to keep in mind that in an undergraduate course we are not training men to be bacteriologists, but, rather, that we are endeavoring to teach those things in bacteriology that are applicable to the practice of veterinary medicine and live stock

sanitation. There are many subjects in bacteriology that are of great interest to a bacteriologist which are of little significance to a veterinary student who is going to use this science as an aid in the diagnosis, treatment and control of infectious diseases or in the treatment of medical and surgical cases. The student should come to realize that bacteriology is a science, that he must understand its principles and that he must know thoroughly the details that are applicable in the general practice of veterinary medicine.

As the details depend largely upon the teacher, the time allotted to the course and the facilities for laboratory work and demonstrations, your committee respectfully submit the appended suggestions regarding subject matter, methods of instruction, equipment, time given to the subject, place in the curriculum, qualifications of teachers and library facilities as fundamental in conducting successfully courses of instruction in bacteriology in veterinary colleges.

1. *Subject Matter.* The course should include, first, the elements of the science of bacteriology, such as the classification, morphology, distribution and function of bacteria; the principles of sterilization and disinfection, the isolation and cultivation of microörganisms and workable methods for the same; the kinds and sources of bacteria found in water, milk and animal excreta; the relation of bacteria to disease and the elements of immunity. Secondly, the student should study certain of the bacteria that cause disease in the lower animals, their life requirements, peculiar cultural or staining properties, channel of infection, means of escape from the infected animal and the fate of the organisms outside of their host. If there is not a separate course on protozoa, the essentials of protozoölogy, including the life history and descriptions of species pathogenic for animals, should be included in the course in bacteriology. It is believed that at present it is best to include pathogenic fungi and protozoa in the course in bacteriology.

In addition to this preliminary course there should be an advanced or special one on the reaction of tissues to bacterial and foreign protein, the preparation, significance and use of vaccines, bacterins, antitoxins and serums, together with the principles of immunity and the methods for establishing the same. Practical instruction should be given in laboratory diagnosis, including both bacteriological examinations and serological tests.

2. *Methods of Teaching.* Experience has shown that this subject can be taught best by a combination of lectures, recitations and laboratory work following a text-book and well-organized laboratory exercises. The lectures are valuable in giving the proper perspective to the subject; the recitations are necessary to ascertain that the student has the correct meaning and understanding of the terms and facts as given in the text-book and lectures; and the laboratory work is required to give actual experience in handling bacteria and in bacteriological methods. The principles of diagnosis and prophylaxis are taught better and more fully comprehended by the student in well-directed laboratory exercises than by any other means. In such exercises the student is disciplined in the subject so that later in practice he instinctively guards against infection, recognizes the importance of early diagnosis and hastens to institute measures for prevention and control.

3. *Equipment.* There is no subject in the technique of which greater care and skill is necessary than in bacteriology. This must be acquired, in a certain degree at least, by each student before he arrives at a working understanding of the subject. For this part of the work a laboratory is a necessity and for this laboratory certain equipment is indispensible. This need not be elaborate, but should be adequate to enable each student to do individual work. For example, each student should be furnished for his individual use a good compound microscope equipped with dry lenses, an oil immersion objective and an Abbe condensor, a hand magnifier giving magnification of 3 to 10 diameters, a platinum loop and needle, proper table and incubator space, antiseptics, stains and sufficient media and glassware for the exercises. He should also have access to sufficient space in the sterilizing apparatus to enable him to do his own sterilization so that he may practice the methods and observe results. There are many other appliances which make for better work and greater convenience and for these reasons are desirable but which can hardly be classed among the indispensibles for good instruction.

4. *The Place in the Curriculum and Hours Credit.* It is our opinion that the elementary instruction in bacteriology should be given in the second year of a four-year curriculum and that the advanced course involving specific reactions for diagnosis, immunity and biologic prophylactics should be given in the

fourth year. This seems to place them in a logical sequence in reference to the basic sciences and applied subjects.

The time devoted to the preliminary course should be not less than five and preferably six credit hours. We approve of one lecture, two recitations and three laboratory periods of not less than two and one-half hours each weekly for one-half year. It is necessary, however, that the individual teacher should arrange these details as suited best to his personal ideas and methods of instruction.

The time allotted to the *advanced* course should be at least three credit hours and the subject taught preferably in the first term of the fourth year. This course should consist of one lecture and two laboratory periods weekly. Because of the expense in securing the requisite number of experimental animals for individual work, it is believed students can work in groups of from two to six with advantage and that demonstrations can be substituted for certain parts of it.

5. *Qualifications of the Teacher.* As the purpose of bacteriology is to explain the phenomena of infection, the spread of epizoötic diseases, methods of diagnosis, the theories of immunity, the production of vaccines. bacterins, antitoxins and serums, together with the more common functions of bacteria, it is essential that the teacher of this subject should have not only a thorough knowledge of bacteriology itself but also a fundamental training in pathology and the tissue changes stimulated by microörganisms. Unless the teacher is familiar with these subjects he cannot bring about the proper attitude in the student's mind toward bacteria in their relation to animal disease nor impress upon him the importance of the subject.

As bacteriology, as applied to medicine, is an integral part of pathology, medicine, surgery and sanitary science, it should be taught in such a way that the student will see and understand this correlation of subjects.

6. *Bacteriological Literature.* Of first importance is a good reference library so conveniently located that it confronts the student in his daily work. It should contain a good assortment of text and reference books on bacteriology and protozoölogy, together with the current journals on these and closely allied subjects, such as the Journal of Infectious Diseases and Medical Research. There should be a special effort to have the students familiarize themselves with the literature of the subject. Special attention should be called to important papers and if possible

abstracts of a few of them should be made by the students and criticised by the teacher. It is to the current literature that the practitioner must go for new knowledge of the subject. For this reason students should be carefully inducted into the habit of using books and journals.

As applied to medicine, bacteriology has for its purpose the elucidation of one of the great causes of disease, namely, *infection.* It explains the meaning of infection in its multitudinous forms. As a science, it provides methods for the prevention of infections and theories for the explanation of the reaction of the body tissues to the invasion of microörganisms.

We believe the subject matter and methods suggested in this report include as much of bacteriology as can be wisely taught in an undergraduate veterinary course.

V. A. Moore,
W. J. Crocker,
C. D. Rice,
Committee.

COMMITTEE ON METHODS OF TEACHING ANATOMY.

In view of the fact that it would not be feasible to formulate our report by means of meetings of the committee and that it is scarcely practicable to do so satisfactorily by correspondence, it seemed that our objective could be attained best by a division of the work among the members of the committee and the development of a joint report.

The subject of anatomy is conventionally subdivided into gross anatomy, microscopic anatomy or histology, and embryology for this purpose and the consideration of these branches has been undertaken by the chairman, Dr. Chamberlain, and Dr. Lentz, respectively.

In adopting this procedure the committee feels the need of emphasizing the essential unity of the whole subject of anatomy and regards as a serious pedagogic error the unnaturally sharp division of the branches of the subject, which is still prevalent in the organization and instruction of some of our veterinary schools. In this respect we might well pattern after the methods of the better type of medical colleges, in the great majority of which all of the anatomical work is included in one department. This is necessary in order to attain reasonable efficiency, co-

incident with the minimum expenditure of effort and money, and for the following reasons:

1. It is the only means by which the proper correlation of the various branches can be ensured and the student enabled to gain a comprehensive and connected knowledge of the whole subject.

2. It is the only certain way to prevent unnecessary duplication of instruction and equipment.

3. It is the only favorable arrangement for advanced and graduate work, and thus for the broad and thorough training of men for research and teaching.

The foregoing advantages are of the greatest importance and there is little to put on the other side of the scales except prejudice, tradition and inertia—a trio which always stands in the way of progress. Unfortunately the situation is complicated by personal, departmental or college jealousies in many cases and administrative authorities often prefer to ''let sleeping dogs lie'' in the hope that ''things will work themselves out'' or that death or mundane translation will remove some obstacles from the path of unpleasant duty.

Probably the only arguments which have been brought forward against the modern type of organization that are worthy of any consideration are (1) that it tends to inhibit specialization; and (2) that the practical applications of the subject are sacrificed; while the scientific or morphological aspects are unduly emphasized.

With regard to the first of these objections it may seem to be merely uttering a platitude to say that too early and too narrow specialization are to be avoided, but sometimes these obvious facts need to be reiterated. One becomes painfully aware of such need when we are confronted with the pedagogic crime of a man being put in charge of instruction in a major subject or an important branch immediatley after graduation. On the other hand, experience has fully demonstrated that in a well-organized department judicious specialization is encouraged and coöperation in teaching and investigation soon becomes habitual.

With regard to the objection that in some departments the purely morphological or scientific data and concepts are emphasized at the expense of facts of immediate professional importance and of practical applications, it must be admitted frankly that this is quite too often the case and that it is a very serious

defect in instruction. But this is not really a defect of organization. It is essentially a defect of personnel and is one which is by no means confined to the anatomical part of the curriculum. In many cases it is due to the instructor's lack of knowledge of the subject, who, of course, can teach only that which he knows something about. In other cases the teacher has little or no knowledge of, or interest in, the special requirements of veterinary students. Instances are not wanting of a feeling on the part of a professor that it is really beneath his dignity to teach veterinary students and that he cannot condescend or trouble himself to organize the work to meet their needs. The incorporation of two or more of these deficiencies in one instructor is by no means uncommon and the embodiment of all of them has been observed repeatedly.

It is generally admitted without argument that sound, practical and lasting anatomical knowledge is almost exclusively the product of careful and methodical work in the laboratory. But it is not sufficiently comprehended that such information can only be acquired slowly by the average student and that it is therefore necessary to make very full provision in the schedule for this work. Still less does it seem to be realized that the training which the student should receive in the anatomical laboratory, in making full and accurate observations on the material and in acquiring the greatest possible skill in handling instruments, is of extreme value in subsequent courses, especially surgery, physical diagnosis and pathology. In order to make the transfer of this training as complete as possible it is essential that the methods used in the anatomical work should approximate as nearly as is feasible those to be employed in the courses in which the results of anatomical study are to be applied. Probably the best concrete example of what is here intended is the practice of studying the structure of the living animal by careful and thorough inspection and palpation. The writer has advocated this procedure for a good many years and is firmly convinced that college authorities make a very serious mistake if they fail to provide adequate facilities for this most valuable means of correlating the anatomical and clinical branches. In the limits of this report no detailed statement can be made of the numerous advantages of the method here strongly recommended. Many of these advantages will be evident at once to any wide-awake clinician and to every anatomical teacher who is sufficiently aware of clinical requirements in this respect. The

facilities for carrying out this mode of study and instruction are essentially the same as those for any other modern and strongly objective method, viz., necessary provision in the schedule for time, adequate quarters and material and sufficient well-trained and experienced instructors. Good results can be obtained only when students are handled in small groups; the number of students in each group should, if possible, not exceed six. Subjects for this purpose should be kept immediately adjacent to the dissecting room, so that they are promptly available whenever desired during dissection, thus avoiding loss of time and disorganization of the work. The method should be used in connection with the study of the skeleton and should be continued thereafter throughout the anatomical courses. In this way the student acquires skill and accuracy in observation and palpation, as well as genuinely practical knowledge, which furnishes a secure foundation for good clinical work. Scarcely less important is the fact that he gets an insight into the practical applications of his hard-earned anatomical knowledge and naturally takes a greater interest in his work. Finally, in conformity with the well-established psychological principle of association, the facts become more firmly established in his mind and can be readily recalled when needed.

In the dissecting room students should use the same kind of instruments as are used in surgery, as far as this is possible. At the beginning he usually needs to be taught how to handle them properly, to keep them clean and in good working order. Experience shows that very few students know how to sharpen a knife and instructors should demonstrate this very elementary but essential procedure at once to prevent students getting into the bad habit of attempting to dissect with a blunt scalpel. Scissors—which should have both points blunt—are still not used nearly as much as they should be in dissecting. Perhaps this circumstance has had an important influence on veterinary operative technique; it is a notable fact that many veterinary surgeons use scissors to a very small extent as compared with their confreres in human practice. A very large amount of dissection can be done much more rapidly and effectively with scissors than with scalpels, and the acquirement of skill in this respect is good training for rapid, yet clean and safe, operative procedure later on.

The principle and practice of conservation in surgery have long been regarded as fundamental. But there has been little

recognition of this idea in veterinary dissection until recently. Of course in the days of short courses and unpreserved subjects, dissection was largely a race against time and decomposition, and speed was therefore a prime necessity. In these days there is no such excuse for rough and slovenly work, at least in those colleges which allot a proper amount of time and instructional force to the anatomical department. Students should be taught, for example, that careful dissection and study of the fasciæ are necessary, since they are in many respects of great surgical importance and of much physiological interest. Some of us can recall that in our student days these ubiquitous membranes seemed to be regarded simply as a nuisance which concealed structures of real importance, and were therefore to be dealt with in the most summary manner possible. Similarly the limits of the joint capsules, synovial sheaths and bursæ should be studied accurately. It seems decidedly advisable to require a student to dissect and learn the larger vessels and nerves even during the first year's work, when his chief concern is to gain a thorough knowledge of the bones, joints, muscles and viscera. The reasons for this are: (1) That he may not get the careless habit established of reflecting skin, fasciæ and muscles without looking out for underlying structures—a habit difficult to overcome later when such procedure will prevent acquiring the kind of anatomical knowledge necessary for the successful practice of medicine and surgery. (2) That the student may acquire a sufficient working knowledge to form an adequate basis for good topographic dissections and for intelligent use of sections.

It would seem that the pedagogic difficulties which confront anatomical teachers are not fully appreciated by college authorities or even by their colleagues. These difficulties have increased during recent years until the conscientious teacher sometimes almost despairs of meeting them successfully. With the passing of the horse doctor type of specialist and the great extension in the range of anatomical knowledge required in the clinical years of the curriculum, the problem of selecting from the vast array of anatomical facts those which are actually essential, tests severely the judgment and courage of the most experienced teacher. The physiologist, the pathologist, the surgeon, the professor of medicine each demands that the student must come to him provided with certain categories of anatomical facts. The sum of these irreducible minima is almost staggering, and it must be attained in two years by students fresh from the often

painless methods of the high school, who must first be taught how to observe and to accumulate a difficult scientific terminology.

Attention may properly be directed here to an unfortunate and quite unnecessary difficulty encountered by instructors and students of anatomy. The reference is to the archaic and confused anatomical terminology which persists to a great extent in clinical instruction and literature. This is a serious hardship to the student and should be remedied promptly. It is high time clinical instructors ceased to speak or write of os innominatum, extensor suffraginis, flexor metatarsi, Steno's and Wharton's ducts, right and left sacs of the rumen, plantar nerves of the fore limb, etc. It should be clearly recognized that the determination of anatomical names and facts is to be left in the hands of their anatomical colleagues. It is true that anatomical terminology has been in rather fluid state during the past decade, but it is equally true that great progress has been made in this respect in the anatomical instruction of our colleges; many useless synonyms have been dropped, undesirable names eliminated, and a long step taken toward a more uniform and sensible nomenclature. This change has removed a heavy burden from students in this very important branch, thus allowing their energy to be devoted more exclusively to the acquisition of really useful knowledge. It is very unfair to the student and entirely indefensible from a pedagogic standpoint that clinical instructors should attempt to inflict on him a mass of obsolete terms, many of which are no longer to be found in any anatomical work known to the student—some of them, in fact, have never occurred in any book on anatomy. Much of our clinical literature is badly in need of revision in this respect, and the opportunity might well be utilized to bring it up to date in other directions. It is earnestly desired by anatomical teachers that they may have the prompt and thorough coöperation of their colleagues in other branches in this matter.

But other difficulties are not so easily disposed of. The selection of matter is one of the hardest problems, as has already been indicated. We may eliminate minor attachments of muscles (especially those which are deep-seated), ignore the smaller vessels, and deal as briefly as possible with the finer structure of the central nervous system and sense organs as is consistent with the demands of physiological study. On the other hand, we may emphasize those regions where injuries and abscess-formation are

most common and where operations are frequently necessary. But shrapnel fragments, barbed wire and other traumatic agencies do not exercise any perceptible selective action, and in such cases the practitioner usually has no opportunity of refreshing his memory by reference to the literature.

The problem would be greatly simplified in some respects if it were known what field of activity the student intended to enter. But this matter is not usually decided till late in the course, and in many cases not then; often radical changes of work are made after graduation without any special preparation therefor. Some of our best medical schools are beginning to offer selective courses, partly to relieve the congestion in the required work, and partly to meet the needs of specialization in practice. Similar action in the veterinary colleges would no doubt be indicated if our students had as good biological training as is now required for entrance to the medical colleges, provided also that specialization in practice was established. Even under our present circumstances a small amount of elective work seems desirable. But this does not help matters much, as such work is chiefly additional and does not replace required courses.

It has long been customary to devote a considerable part of the time to routine lectures on anatomy. This practice must be abandoned or at least a great reduction made in the time so utilized. It is becoming generally recognized by thoughtful teachers that the lecture method is relatively inefficient and that the time can be much more effectively employed in quizzes and demonstrations. It is sometimes urged that the lecture is the best means by which the instructor can select the material and emphasize matters of greatest importance. But in general these desirable results can be secured better by the quiz and by laboratory conferences and demonstration. In addition the latter methods provide the only adequate and reliable means by which the instructor can keep constantly informed as to the progress of his students, and—a no less important desideratum—the student can gauge his success in his work. One of the most valuable features of the recitation is the training it gives the student in expressing himself accurately and clearly. In a properly conducted quiz the student is required chiefly to state the results of his observations in the laboratory, and it should not be possible for him merely to repeat statements which he has read or heard in lectures. It is decidedly stimulating to the student to know that he will frequently be called upon to demonstrate his

knowledge of the subject and that his views will be subjected to the criticism of the instructor and of his classmates.

It must be admitted with regret that, with very few exceptions, our colleges have not made even fairly good provision for successful anatomical instruction. In general the quarters allotted to the anatomical department are inadequate and not well designed for the purpose, salaries are insufficient to obtain or to retain well-trained instructors, and sufficient funds are not available for equipment and material. This state of things cannot be permitted to persist in the development of our educational facilities if anatomical teachers are to be held responsible for the proper training of students in this important branch, on which so much of the subsequent work is based in a large degree. It would seem desirable that administrative officers inform themselves as to what has been done in this matter by the better class of medical schools, in which the anatomical department has received its due share of funds and facilities.

A good museum has always been regarded as an important feature of the college plant. Too often, however, it is chiefly a storeroom or a heterogeneous assemblage of curiosities and material of little instructional value. The development of an anatomical collection which is constantly and effectively used for teaching purposes is a very different matter; its maintenance, growth and utility involve a large amount of expert work and no small expenditure. In order to furnish the desired information and to be directly available for inspection and study, specimens must be carefully selected and prepared, properly installed in containers and cases so as to be visible, and labeled and catalogued in order to be found readily. So far as possible the arrangement should be such that the specimen need not be removed for examination. In some buildings, halls and corridors can be used for the installation of cases containing specimens to which reference is frequently desirable. The placing of skeletons and other bone preparations (preferably in cases) in the dissecting room is very useful, as it furnishes the student with the means of refreshing his memory with regard to areas of muscular and ligamentous attachments, vascular and nervous relations to the bones, visible and palpable prominences, etc.

In addition to constant supervision in the dissecting room students should be provided with printed or mimeographed dissection guides. This ensures orderly and effective procedure and trains the student in careful and systematic methods of work.

It also conserves the time and energy of instructors and makes it possible for them to demonstrate important points, assist the student in technical difficulties, and quiz on the material in hand. Tact and judgment should be used in answering questions and students should not be furnished with information which they can obtain without special difficulty. ''Spoon-feeding'' is highly undesirable in the case of men who are preparing themselves to solve the problems of medicine and surgery.

Another difficulty is the matter of linking up the anatomical work with related branches of the curriculum. The need of correlation is of course unquestioned. The problem is to secure this correlation without undesirable overlapping. It has long been customary in anatomical study to deal with the action of joints and muscles and it is no doubt desirable to allude briefly to the functional significance of other structures. Pathological and clinical implications may also be mentioned with advantage at certain points. But considerable care is needed in this procedure, as there is a real danger of dislocating the student's attention from the main object, viz., the acquisition of anatomical knowledge. It seems best to ensure a fuller comprehension on the part of the student of the professional objects of anatomical study and of its relations to the patholgical and clinical branches by means of a course in applied anatomy which is organized in content and method for this specific purpose.

In order to keep this report within reasonable limits it has seemed necessary to confine attention mainly to principles and methods, and thus to omit consideration of some materials of instruction, such as X-ray and other photographs, charts, lantern slides, models, etc. Reference to these and other matter of interest may develop in the ensuing discussion.

Teaching Histology.

(F. W. Chamberlain)

Teaching of any subject is an art. The artificer only is efficient and his efficiency depends on, first, his knowledge of the subject, and, secondly, his adaptability. Knowledge of a subject comes to one only after years of experience, thus in the teaching of any subject the teacher shall have had long experience and should possess such temperament or mettle that he makes constant progress.

At this institution, from its inception, and as a part of the veterinary curriculum, anatomy, both gross and microscopic, has been handled by one department. It occurs to the writer that this correlation of anatomy subjects has no disadvantage, while, on the other hand, it has every advantage. It permits the work to be so arranged that the student becomes familiar with the tissues and organs, their origin and structure, in such a manner that the animal body is revealed to the mind completely and without repetition. Repetition tends to familiarity but it also tends to incompleteness.

The relation of anatomy to other subjects ordinarily incorporated in a veterinary curriculum is such that it should precede physiology and pathology and should be given coincidently with chemistry and physics.

Turning our attention to histology specifically, the writer is not in favor of occupying the student's time with extensive lectures. When lectures are desirable they may be presented to students in printed form, thus saving time for the student which may be utilized to precede laboraotry work, with explanations and demonstrations consisting of specimens gross and microscopic, the latter through the use of a projectoscope or microscope and charts and models.

Following the above preliminary work the student should study the tissues and organs in microscopic preparations while referring to notes and some good text. The principal object to be attained in the teaching of histology is a knowledge of the normal tissue in a comparative sense and to enable the student to identify the same by the arrangements of cells and tissue. To this end much practice should be given the student when he is studying with the microscope to identify systematically the cells and tissues of tissues and organs respectively, after which he should make pencil drawings of the same and in such manner as to show structure. Sufficient laboratory technique should accompany the work to familiarize the student with the preparation of tissue and organs for microscopic study, but not the extensive work of the technician.

Work with the microscope should be followed by complete constructive quizzing, in which the student is led to build up hypothetical tissue and organ. The destructive quizzing employed by some teachers is to be discouraged as a waste of time and a detriment to the student by destroying his confidence.

Time to cover the work in histology should approximate 200 hours; 50 hours' demonstration and quizzing and 150 hours for laboratory work, which time may be subdivided according to subjects approximately as follows:

Subject	Lecture	Laboratory
Tests	3	6
Cell	3	8
Epithelial tissue	2	6
Connective tissue	4	12
Blood and lymph	4	14
Muscular tissue	2	6
Nervous tissue	2	6
Blood and lymph systems	3	8
Digestive system	6	20
Respiratory system	1	4
Skin and appendages	2	8
Central nervous system	4	12
Organs special sense	5	12
Female generative organs	2	6
Male generative organs	2	6
Urinary organs	2	6
Technique	3	10
Totals	50	150

Grading of work is based on the results of written and microscopic tests and laboratory drawings.

An attempt has been made by the writer to combine the courses in embryology and histology and with very favorable results. With the additional time given to embryology and the lack of repetition much time is saved and the subject more completely covered. The time given to the subject is 22 lectures and 33 laboratory hours, which should be distributed through the course.

Teaching Embryology.

(William J. Lentz)

Because of the great importance of embryological interpretations in understanding adult tissues and in that embryology explains much in normal and abnormal conditions and through its knowledge the veterinarian is able to intelligently understand and correct defects that he is called upon to remedy, it is without question an important fundamental study and should receive more attention than is usually accorded it. In a four-

year curriculum I believe that a laboratory course should cover about 72 to 90 hours and as many accessory lectures as time permits, at least one a week, unless the work in Histology is arranged on an embryological basis in which the development of each organ is taken up as an introduction to the study of its microscopic structure in the adult. If this much time is not available the student should certainly at least take up the development of the chick during the first eight-ten days, macroscopically and microscopically, and supplement that with sections of the pig at two or three stages and should most certainly know of maturation, ovulation, spermatogenesis, fertilization and the formation of body wall and amnion, and also general organogenesis and especially placenta formation and the various types, also dentiton in its early stages. To me a knowledge of embryology certainly seems essential to an ideal veterinary course and the student should have not less than at least one semester's work in comparative embryology.

Dr. F. A. Lambert has resigned as Assistant Professor of Comparative Anatomy in the College of Veterinary Medicine, Ohio State University, effective at the end of the present academic year. Dr. Lambert has accepted the position of Ohio representative for the Lederle Antitoxin Laboratories of New York.

Dr. Lambert was discharged as Captain, V. C., U. S. A., recently and returned to the university to complete the academic year. He was from September 1, 1918, to January 16, 1919, Commanding Officer of the Veterinary Battalion in the M. O. T. C. of Camp Greenleaf and is therefore widely known to veterinarians in practically every State in our Union. In resigning his connection with the Ohio State University, Dr. Lambert severs a position long held. For since his undergraduate days he has been a protege of Professor S. Sisson. For three years also, 1915 to 1917 inclusive, he served the State Veterinary Medical Association as secretary. Dr. Lambert will continue to make Columbus his home and headquarters.

Major E. B. Ackerman, late of the Army Veterinary Service, filled the role of veterinarian to the Brooklyn Riding Club horse show in April.

Dr. Robert McCully of New York acted as veterinarian to the indoor horse show at Durland's riding academy in May.

COMMUNICATIONS.

Chicago, Ill., May 14, 1919.

Editor, Journal:

A question has been raised with reference to the code of ethics of the A. V. M. A. and refers particularly to Section 7. This section reads: "It shall be deemed a violation of the code of ethics for any member of this association to contract with or through the officers of any live stock insurance company for the professional treatment of the member's stock so insured, but this rule shall not prevent any member from becoming an examiner of risks and acting in the capacity of an expert for the same."

It is claimed by some members that this places members of the A. V. M. A. at a disadvantage as compared with practitioners who are not members of the A. V. M. A. and who are at liberty to sign such a contract. It is also pointed out that this class of veterinary work is becoming more important each year and that work of this kind must be done. It is also stated that this work is practically on the same basis as any other contract work for the private company and attention is also called to the fact that certain life insurance companies have a similar contract with physicians who look after their insured.

This is a very important subject and is worthy of careful consideration of members of the association. It is hoped that all those interested will take the opportunity of expressing their ideas on this subject through the columns of the Journal.

N. S. Mayo.

Lafayette, Indiana, April 15, 1919.

Editor, Journal:

The Extension Department of Purdue University has endeavored to make it possible for every class interested in agriculture or live stock in Indiana to receive the benefit of the knowledge of the most learned men in the country on the various subjects pertaining to the two above-mentioned industries. Just recently the veterinarians of Indiana had the privilege of hearing Dr. W. W. Dimock of the Iowa State College discuss the differential diagnoses of swine diseases. Six different points in the State were selected where meetings were held. The points most convenient for the local veterinarian to reach were consid-

ered in each selection. The State Veterinary Department and B. A. I. force gave splendid aid in making these meetings a success. The total attendance was 251 veterinarians.

It is the intention of the Extension Department to bring on different specialists in the future to discuss the various diseases prevalent in Indiana. Arrangements have been made to bring in Dr. W. E. Cotton, Assistant Superintendent of the Experiment Station at Bethesda, Maryland, Bureau of Animal Industry, to discuss contagious abortion disease before the Indiana veterinarians. These meetings have been scheduled for the first week in June, from the 2nd to the 6th, inclusive. The itinerary has not been made out at the present time, but it will appear in the June issue of this Journal. The next series of meetings will probably be held about the first week in October.

In conclusion, I feel obligated to pay my respects to Dr. Dimock for the splendid manner in which he handled his subject before the Indiana veterinarians. The boys from Indiana will not soon forget Dr. Dimock, and it will take time for them to realize the benefit derived from attending the meeting where Dr. Dimock spoke.

A report of future meetings will be sent to this Journal.

L. C. Kigin, Extension Veterinarian.

Lima, Peru, March 10, 1919.

Editor of Journal of A. V. M. A.:

As a Danish veterinarian (though born in the States) I should like to call your attention to an interesting paper by a Dane published in August in a Danish veterinary journal (Maanedsskript for Dyrloger), "The Etiologi and Pathogenesis of Milk Fever."

The paper (translated in German) has been awarded with diploma for degree of doctor of veterinary medicine by the medical faculty of the University of Leipsig.

A Dane (Schmidt of Kolding) being the inventor of the first effective treatment of the disease, I should like Americans to know that another Dane, Dr. Med. Krogóe-Petersen, has issued a paper that seems to furnish a very attractive and adequate explanation of some of the darkest mysteries of the disease. The secret lies apparently in the *falling* of the barometer.

If you care for a report on it I can offer the following:

"Etiologi and Pathogenesis of Milk Fever" (Kalonings Feberens Etiologi of Patogenese) Krogóe-Petersen. Maaneds-

skript for Dyrloger, Bind. 30, No. 9, August, 1918, pp. 225-346. Translation in German awarded doctor's diploma by medical faculty at the University of Leipsig, Germany.

The author calls attention to the well-known fact that the disease, on acount of conditions favoring it, such as rational breeding and increased milk production, etc., is a comparatively new disease. A Danish veterinarian, Professor Carl Viborg, described the disease in 1818.

Since then an endless lot of theories and hypotheses have been set up and the author gives an account of the most important ones to show how different and confusing they are. A popular and old conception among lays in Denmark is that the cause is a transmission of the milk into the blood.

Harms believes in an airembolus in the brain through the entrance of air in the vessels of the uterus. Hess and Guillebeau believe in infection and intoxication. Franck believes in an anemia in the brain on account of serous extravasation in this organ. Kaiser supposed the cause was the work of bacteria in the bowels. Thomassen believes in infection of the udder as the cause. Nocard finds cocci in the uterus. Erhardt speaks of chronic intoxication during the preceding dry period suddenly becoming acute by parturition.

There are mentioned many other theories and hypotheses, such as collateral anemia of the brain, corresponding to hyperemia of the udder or anaphylactic phenomena of the production of milk. A Dane, L. Andersen, Gimlinge, has proved several years ago that the mortality is low by rising barometer, but high when the barometer is falling, but draws no further conclusions.

The idea of Schmidt, Kolding, was that there were produced certain toxins in the udder, and consequently his first treatment was to inject a solution of K. I. in the udder, and besides he used massage. Later he modified the treatment.

The author then criticises the theories founded on intoxication and infection, pointing out the essential difference between certain well-known and recognized intoxications with their positive anatomical changes and bad prognosis on one hand and, on the other hand, the complete and often wonderfully quick recovery of the milk fever cows, and, moreover, the practically negative postmortem in case of death of the latter. Some changes often reported in milk fever patients, such as necrosis of muscles, are shown to be non-specific. Moreover, there is mentioned the

improbability of intoxication or infection in animals so apparently healthy as these patients. The author calls attention to the likeness between the symptoms, etc., by bleeding to death (internal hemorrhage) and milk fever. The author states that milk fever is no absolute puerperal disorder, he himself having treated at least twenty typical cases several months from the time of parturition. The author noticed, after having practiced a few years, that he very often was called to milk fever cows in snowstorms, or at least almost always in bad weather, and began studying the barometer in relation to the disease. He found that, as a general and almost infallible rule, the cases all occurred immediately after a falling of the barometer from any height or when the barometer was very low. In some cases it could be steady, or even slightly rising, but in these cases it was always very low.

During three years he has collected 516 cases, partly from his own practice and partly from eleven neighboring veterinarians. Several tables show that the disease practically always occurs during the falling barometer, or when the barometer is very low. A few cases (that seem to have nothing to do with the barometer) occurred during sudden unusually hot spells.

The writer states that many cases of the so-called chronic indigestion in cows most probably are cases of milk fever several months after parturition, because the ''air treatment'' helps and often cures many of these cases.

He states that (as shown by the tables) the severity of the particular cases is proportional to the fall of the barometer, so that a case occurring in consequence of a rapid and considerable falling is severe, and the recidives after treatment usually occur in accession to a continued falling or low height of the barometer. The author resumes: (1) Milk fever always appears in concurrency with special meteorologic circumstances. (2) The great majority of the cases occur either with falling barometer from any height or when the barometer is very low, lower than normal (760 mm.). (3) In very few cases milk fever will occur during a sudden unusual hot spell and apparently independent of the barometer. (4) Some cases occur with falling barometer and at the same time unusual hot spell. The cases pertaining to (2) occur during, or the day after, the falling of the barometer, or they occur during, or the day after, a very low height of the barometer. The severity of the attack in this group varies greatly, but the ones treated the ''day after'' are usually recovering

or not severely attacked, and the disease usually has been noticed the day before treatment. The cases pertaining to (3) are severe and the cases pertaining to (4) especially severe.

The author then explains the reasons that make him believe that the barometrical changes are the primary cause of the disease, and he says: If the decrease of atmospherical pressure is the cause, then an occasional rising of the barometer during the attack ought to be able to cure the disease, and this is exactly what very often does happen. As a further proof for his theory the author calls to attention the work mentioned by L. Andersen, Gimlinge, in 1894, treating 217 cases. According to this paper, the percentage cured during rising barometer was almost equal to that of our modern air treatment and even better than the very first treatment of Schmidt, Kolding (1896). Further, he says: The total surface of a cowhide being about six square meters, a decrease of 10 mm. pressure in the barometer corresponds to a total decrease of pressure on the cowhide of 816 kg. Moreover, he points to the symptoms so well known from the sudden evacuation of large quantities of liquid from serous cavities.

Several other propositions from human medicine are mentioned hereby drawing parallels.

The author then explains the means by which the falling pressure influences the patient and draws attention to the extraordinary richness of blood vessels in the skin and udder of a good milch cow. The sudden decrease of pressure gives a hyperæmia in these parts. Rubeli has shown that an extirpated cow's udder weighing 14 kg. will hold 10 liters liquid in the blood vessels, besides 3 liters in the cavities of the glands. The sudden evacuation of the abdominal cavity by birth gives a strong dilation of the vena porta system. All this gives a considerable decrease of the total blood pressure, besides a strong collateral amemia in the brain, with stagnation of the blood in this organ, a decrease of the common vital functions and secondary autointoxication, with elimination of sugar and albumen in the urine, and finally death, nervi vagus and sympatheticus react for the cerebral anemia and there appears "vagus puls" and digestive disorder (typmpanitis and paresis of the bowls).

As a further proof for his hypothesis is mentioned that milk fever can be cured by injection into the jugular vein or the udder of aqueous solutions of several different things, besides by sodium chloride (Na Cl) solution alone; all things which con-

tribute to recover the sufficient blood pressure. Adrenalin (suprarenin) injected (subcutaneously) hypodermically cures the disease as readily as does the modern air treatment.

In a later copy of maanedsskript for Dyrloger, the author says that it has been noticed that when milk fever occurs far from the time of birth it mostly occurs during estrum, which means at a time when the genital organs are highly congested.

It is hard to give an adequate extract of the paper, but it seems to me that it is of general interest. Besides the scientific part of it, it is apparently of importance to the practitioner as a help to the diagnosis, prognosis and general understanding of the disease. F. KLEE, Danish Vetr.

Lima, Peru.

An interesting communication has been received from Dr. D. Warnock, Victoria, British Columbia, and after referring to some business matters, the Doctor says:

"After four years of strenuous service with the British Remount Commission and, tempted by this fine climate, I have accepted the position of Deputy Minister of Agriculture and head of the live stock and veterinary branches of the province of British Columbia, with headquarters at Victoria.

"I was Senior Veterinary Officer at Lachine Remount Depot for a year and a half when I was promoted to Commanding Officer, which position I held till demobilization last month.

"We handled many thousand of remounts, chiefly from your side of the boundary, at Lachine and it was a valuable experience.

In June, 1918, I was honored by being appointed "an officer of the Most Excellent Order of the British Empire" for my services in the war.

"I may be able to get you some candidates for membership when I have had time to become better acquainted and shall bear the A. V. M. A. in mind. I am no longer a member of the House of Commons, as I was too busy to accept the nomination in the general election of 1914."

Major Harry F. Steele of the Regular Army Veterinary Corps, who was relieved from service "Over the Seas" because of a bronchial affection, has recovered sufficiently to be assigned to duty at the Remount Station at Fort Sam Houston, Texas.

NECROLOGICAL.

DR. DAVID E. WRIGHT.

Dr. David E. Wright, who retired from practice at Reno, Nevada, in November, 1916, owing to ill health, died of tuberculosis at Colfax, California, March 28, 1919.

Dr. Wright was born at Logan, North Dakota, July 30, 1891, and graduated from the New York State Veterinary College, at Cornell University, in 1912. He was a member of the Omega Tau Sigma fraternity, Orleans Lodge No. 55, F. & A. M., Barton, Vermont, and the A. V. M. A. He was unmarried.

Interment took place at Colfax, California, under the auspices of the Masonic lodge of that place.

A BILL THAT OUGHT TO PASS.

We understand that a bill is to be presented to the Michigan Legislature to provide for the testing of tuberculous cattle used for milch and breeding purposes within the State; to provide the method of making such test; the record of the same; the disposition of cattle afflicted with the disease; and to provide penalty for violation, etc.

We further understand that the passage of the bill is favored by health authorities generally, and that Dr. George H. Carter of Saginaw is one of the leaders in this progressive movement.

Any intelligent and practical measures that can be taken to aid in eliminating this fell scourge should receive the hearty endorsement of all right thinking people; and the Journal congratulates its Michigan friends in the important step they have taken. May their efforts be crowned with success.

Lieutenant Frank T. O'Sullivan of New York of the Veterinary Service of the A. E. F. has been honorably discharged and returned to practice in New York.

Dr. W. N. Gaston has located at Peterson, Iowa.

MISCELLANEOUS.

ONTARIO VETERINARY COLLEGE.

GRADUATING EXERCISES.

The graduating exercises of the Ontario Veterinary College were held on Tuesday, April 29.

Addresses were delivered by the Hon. George S. Henry, Minister of Agriculture, Dr. J. G. Rutherford, C. M. G., Board of Railway Commissioners, and Dr. F. Torrance, Veterinary Director General.

In the course of his address the Minister mentioned some of the achievements of the live stock breeders in Ontario. He also referred to the importance of maintaining live stock interests and appealed to the graduates to coöperate with representatives of the Department for the further development of the live stock industry.

Dr. Rutherford outlined the advantages which the present graduate had, and the position he should occupy in the community for the rendering of efficient service. In particular he emphasized the need for adjusting veterinary education and training to meet the changed conditions, and for more consideration to be given to the breeding, management and improvement of all classes of live stock and the importance of preserving the health of food-producing animals and increasing their productiveness.

Dr. Torrance in his address gave testimony to the value of veterinary science and service. Firstly, by the work of the Army Veterinary Corps during the war. As a result the wastage of horses was kept much lower than during other wars and also greatly assisted in winning the war by maintaining horses in good health and fit condition for artillery and transport service. Secondly, by protecting the live stock of the nation from the ravages of contagious diseases, particularly foot-and-mouth disease, which was stamped out in the United States and prevented from entering Canada. He also made a protest against the granting of diplomas and so-called degrees by correspondence schools.

THE ATTENDANCE.

During the last session the number of students amounted to 70 in all classes. Of this number 39 were in the graduating class, and on passing the examinations were granted the diploma of the college. Included in the graduating class were ten students who enlisted at the outbreak of the war and were returned from active service overseas under routine military orders to continue their professional training. This indicates the importance attached to veterinary training by the military authorities. With the war over it is hoped that the attendance will again return to normal proportions.

EXPANDING THE COURSE OF INSTRUCTION.

The college course now requires four sessions attendance for graduation. Each session comprises seven months, extending from the first of October to the first of May. In view of the extension of the course from three years to four years attendance, an expansion and rearrangement of the curriculum was possible. Several new subjects were added, including Clinical Diagnostics, Practical Meat Inspection, Physics, Biochemistry, and Public Speaking. The subjects of Physics and Biochemistry are being taught at the University of Toronto. The instruction in Clinical Diagnostics should be further extended to include all classes of live stock. The extension in this direction would materially improve the training of the students for general practce and permit of better service being rendered clients in the treatment of diseases affecting farm animals. The training in Public Speaking showed beneficial effects in students by improving their rhetoric as well as their knowledge of the proper procedure in the conduct of meetings. The work of Practical Meat Inspection was conducted at the large abattoirs under the supervision of the veterinary inspectors of the health of animals branch.

Further adjustments and expansion of the course of instruction and training may be required owing to the transition of veterinary usefulness to a greater extent from the city to the country. This is incidental to the somewhat lessened demand for certain classes of horses in cities and to the constantly increasing demand for skilled veterinarians in the farming communities.

SPECIAL FEATURES OF VETERINARY TRAINING.

In addition to training students for general practice as veterinarians, the college also trains them for scientific pursuits and to conduct research work which may tend to solve live stock problems occasioned by obscure diseases interfering with animal industry and causing economic losses.

It also trains the student for special veterinary sanitary service work in preventing and suppressing contagious diseases of animals and in lessening the transmission of communicable diseases of animals to mankind through unwholesome milk supplies and from meats and meat food products of doubtful origin. The inspection of animals intended for export or slaughter is essential for the establishment of an export trade with Great Britain and the United States, as these countries have import regulations strictly requiring veterinary inspection and certification of all live stock and of all meat and meat food products before leaving Canada. Veterinary colleges therefore serve an important national function for the upbuilding of an export live stock and dressed meat trade from Canada by properly training students for the work of veterinary sanitary service.

ADVANCING THE STATUS OF THE GRADUATE.

In order to improve the status of the graduate, the Hon. George S. Henry, Minister of Agriculture, had the act respecting the college amended at the last session of the Legislature. The change will have the effect of discontinuing the granting of diplomas by the college and will enable students hereafter to obtain the uniform degree of Bachelor of Veterinary Science (B. V. Sc.) from the University of Toronto. It will also have the effect of raising the standard of entrance by placing the requirements for admission under the direct supervision of the university. Hereafter applicants for admission will be required to furnish a certificate of at least two years high school or collegiate education or pass an equivalent qualifying examination prescribed and conducted by the University of Toronto. It is hoped that these changes, which are progressively in keeping with the standards of accredited veterinary colleges in other countries, will have the effect of attracting a superior class of young men to enter the profession.

Major E. V. Lusk of the Regular Army Veterinary Service is steadily recovering from the serious illness for which he was returned from "Over the Seas" duty to Lakewood, New Jersey.

OKLAHOMA NOTES.

The State Board of Veterinary Medical Examiners met in the Capitol on April 28, 29 and 30 and examined seventeen applicants, eleven graduates and six non-graduates. The names of graduates who took the examination are as follows:

V. O. Cudd, St. Joseph, Mo.
E. Murphy, Ardmore, Okla.
E. W. Meads, Claremore, Okla.
W. S. Rader, Broken Bow, Okla.
Arthur W. Deems, Fairview, Okla.
Andrew Gillespie, Frederick, Okla.
William Poseiner, Muskogee, Okla.
J. F. Chamberlin, El Reno, Okla.
H. E. Gearhart, Kaw City, Okla.
W. Heffelman, Grove, Okla.
L. F. Bacon, Cedar Falls, Iowa.

Lieutenant William T. Vilott, who has been with the Veterinary Corps in France, has been reinstated to his former position in the meat inspection service at Oklahoma, Okla. He saw some very active service in the vicinity of Chateau Thierry.

Evard A. Dean has resigned his position as veterinary inspector and is practicing at Guthrie.

L. B. Fox, who has been a veterinary inspector at Oklahoma City for the past year, has been transferred to Holbrook, Arizona, to engage in dourine eradication.

Veterinary Inspector H. A. Michel, recently transferred to San Angelo, Tex., has resigned, taken a wife and moved to his former home in South Dakota.

J. P. O'Connor, inspector in charge of hog cholera control, has resigned and formed a partnership with Dr. Ben Dobkins at Vinita, Okla. Dr. Dobkins finds it necessary to devote most of his time to his banking and agricultural interests.

The State Veterinary Medical Association will meet at Oklahoma City June 30 and July 1. The date has been changed to avoid conflicting with other State meetings. A good program is assured.

G. W. Jones, formerly a veterinary inspector on the Chicago force, and more recently with the Quartermaster's Department, U. S. Army, has accepted a position with the Eagle Serum Company at Oklahoma City.

J. C. Freeman, President of the State Board of Veterinary Medical Examiners, recently released from the Army Veterinary Corps, has resumed his practice at Enid.

J. S. Grove, Resident State Secretary.

NUPTIALS.

Dr. Benj. D. Pierce of Springfield, Massachusetts, informs the Journal of the marriage of Dr. Henry Edward Holden and Miss Elsa Ida Allen, at Springfield, Massachusetts, on April 10.

In speaking of the bridegroom, Dr. Pierce says: Dr. Holden has been one of our leading veterinarians for twenty-five years or more and is a successful practitioner, a good fellow and a good neighbor; and after living for fifty years or more a life of single blessedness, it will surely surprise his many friends to hear of his change.

Dr. Holden is a graduate of Liautard's School about 1891. I think he was an assistant to Dr. F. H. Osgood when he was here in Springfield, and succeeded to his practice when Osgood went to Boston.

The Journal desires to congratulate Dr. and Mrs. Holden, and wishes them health and happiness.

Dr. J. L. Herring of Wilson, N. C., has been elected temporary secretary-treasurer of the North Carolina Veterinary Medical Examining Board. Dr. M. J. Ragland of Salisbury, N. C., has been elected temporary president of the Board to fill the unexpired term of Dr. T. B. Carroll, deceased. The next regular meeting of the Board will be held at Wrightsville Beach on June 24, the State Association convening on June 25 and 26.

Dr. W. A. Hornaday, meat and milk inspector of Greensboro, N. C., has been confined to his bed for five weeks with a complication of typhoid fever and malaria. He is slowly improving but remains quite ill yet.

Dr. T. M. Lee has been discharged from the army service and has resumed his practice at Watertown, Minnesota. Dr. Lee writes that after leaving the training camp at Greenleaf he went to Camp Lewis, Washington.

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THE A. V. M. A. A MISSIONARY ORGANIZATION.

Among the various functions of the American Veterinary Medical Association, that of the missionary is by no means the least important in helping to spread the gospel of veterinary science throughout the length and breadth of the land.

There are still many benighted sections of our country that need to receive "the light," where crude ideas as to disease and cruel methods for its relief still prevail, resulting in animal life being the sufferer, and with large financial losses to live stock owners.

The "hollow-horn," "hollow-tail," and "hooks" specialists (?) are still too numerous for the general good; and the operator who places implicit confidence in certain phases of the moon is yet to be found.

In sections of the country where such superstitions still exist, the natural feeling is to adopt the "Macedonian cry" of old: "Come over and help us!"

True, there is scarcely a part of the country in which the Association is not represented by members, although few in numbers in some instances; and while these are doing valiant

pioneer work for the profession, their influence on the stock-owning public is necessarily limited to restricted areas in which they may be located. Or, to use a further quotation: "The harvest is plentiful, but the laborers are few."

There are at least two important results, in a missionary way, the writer believes, the Association, in annual convention, can accomplish in new territory. First, the encouragement of its members, and the profession generally in the section visited; and second, the production of a favorable impression upon the people by their seeing, and having in their midst, the representative body of the veterinary profession of the country. And such an impression, let it be said, the A. V. M. A. has never yet failed to leave in any of its former convention cities.

It is this missionary effort on the part of the Association that the southern section of the country has, for a long time, stood in need of, and which, we are pleased to say, is about to receive the benefit of in the very near future.

As many of the older members may recall, the only annual meeting of the Association ever held in the South was in Nashville, Tenn., in 1897, the Nashville Exposition year. The writer had occasion to remain over in the Tennessee capital for some little time after the convention, and in order to obtain an expression of opinion as to how our body, although much smaller in membership in those days, impressed the people there, asked "mine host" of the headquarters hotel, what he thought of our gathering of representative American veterinarians? His reply was that he never had any idea the veterinary profession was represented by such a splendid class of men. In fact, he added, "Your association was composed of the finest body of men who have met in convention here during the Exposition." To create such a favorable impression, and leave such a good name behind us, is surely excellent missionary work for the profession. Our conventions, especially in new territory, are needed for missionary effort of this kind. They encourage the practitioner; they stimulate enthusiasm among state associations; and they educate the public to the standing, prominence and importance of the profession as a whole.

We are looking forward to just such results accruing from our meeting in New Orleans in November; and not only to the immediate vicinity, but to the entire southern section. And as numbers are always impressive, members should begin to make their arrangements in plenty of time so that nothing may prevent

their being in attendance to help make the 56th annual the biggest and most successful convention the Association has ever held, remembering that we owe it to the profession in the south to make this a big missionary effort in its behalf.

EARTH-WORMS AND ANTHRAX.

A number of years ago Pasteur suggested that the spores of anthrax were brought to the surface, from buried infected carcasses, by earth-worms and spread upon the ground in their castings. The older textbooks carry the statement; and we find authors of recent papers on the subject of anthrax continuing the same.

For some time, however, the writer has been much inclined to doubt the absolute accuracy of the statement of the earlier investigators. In the first place, the anærobic conditions surrounding the infection in the deeply-buried carcass would tend to hasten degeneration and death of the ærobic organisms before it was likely for the earth-worms to come in contact with them, and afterwards raise them from the lower depths to be ultimately spread upon the surface in their excrement.

And further, although the depth to which this annelidian representative descends varies according to conditions of temperature and moisture, in summer it is said to be found near the surface, and in winter, just below the frost-line, and varying in depth according to the depth of that line. Isolated cases are cited by Darwin* where earth-worms have been found at a depth of seven or eight feet, which, however, must be rather exceptional, speaking generally. We would rather give credence to the opinion that the infection on the surface, which has been credited to the upward "freight-carrying ability" of the earth-worm, never had been buried at all, but had been left there through the medium of infected discharges, either rectal, nasal, or other, and overlooked in the burial.

In fact, Harrington† states that "it was thought at one time that, following the burying of animals dead with the disease, the soil could be infected thoroughly through spore formation, the spores being brought to the surface by earth-worms, there to be the cause of fresh infections. Now, however, this view is re-

* Darwin.—The Formation of Vegetable Mould Through the Action of Worms, pp. 109-110.

† Harrington.—Practical Hygiene, p. 303.

garded as untenable, since the spores are not found within the putrefying carcass, and the bacillus itself is soon destroyed in the process of decomposition of the tissues. Thus when a body is buried, the organisms are soon rendered incapable of reproduction or of continuing their own existence.

"The theory that the spores are brought to the surface by burrowing earth-worms was demolished by Koch, whose conclusions were based upon direct experiment, and was abandoned by Pasteur himself, who first suggested it, because of finding spores in the superficial layer of soil at a spot where, two years previously, a cow, dead of the disease, had been buried at a depth of two metres, a depth not ordinarily reached by earth-worms in their burrowing. Therefore, it seems most likely that fresh outbreaks among cattle grazing on fields where others have died and have been buried are due, not to the buried organisms, but to those which in one way or another, from the blood or dejecta of former cases, have been deposited on the surface."

Taking all things into consideration, therefore, the earth-worm theory seems untenable and should be abandoned in the interest of accuracy.

On the other hand, the writer is of the opinion that, if all the natural openings of the carcass are effectually closed, or plugged, with tow or lint cotton saturated with some effective germicidal fluid to prevent the escape, and destroy the infectivity, of any possible discharge, and the carcass interred, with or without lime, the chances for infection being left at that point will be extremely small. In short, if the *whole* carcass, including its infected tissues, discharges and all, is carefully buried, the risk of future infection from that source will be reduced to the minimum, and without much fear of its being brought to the surface from the bowels of the earth in the bowels of the earth-worm.

Dr. Cecil Houston has been transferred from B. A. I. work in Milwaukee to Cudahy, Wis.

The Journal is in receipt of a communication from Dr. H. L. Darby, Rio De Janeiro, Brazil, saying that the first American magazine he saw in the tropics was the March Journal of the A. V. M. A., and we venture to state that Dr. Darby read every word therein and eagerly looks forward to the coming of each number.

HORSE TYPHUS; MORBUS MACULOSUS (PURPURA HEMORRHAGICA).*

B. FRANK SENSEMAN, V. M. D.

This disease was formerly known as typhus or typhoid fever on account of its supposed identity with these diseases.

Hering called it "petechial fever" after its most important symptom, viz: that of hemorrhages in the mucous membranes; he laid particular stress on the fact that petechiæ on the mucous membranes also occur as a mere symptom in diseases, such as strangles, which have no connection with petechial fever.

In England petechial fever was regarded by some as scarlatina; by others as morbus maculosus of man *(Purpura hemorrhagica).* The name Morbus Maculosus was commonly applied to it in Germany by Eberhard. In France and Italy it was looked upon by some authorities, and is regarded by some, even at the present time by Trasbot, as acute anasarca; and was traced, not to decomposition of the blood, but to temporary paralysis of the capillaries and effusion of serum and blood.

Lafosse and others stated that it was either septicemia or anthrax, because it is neither infectious nor can it be transferred by inoculation to horses or to other animals. Besides, the bacilli of anthrax have never been found in the blood of horses suffering from it; and some of its symptoms are incompatible with the suppuration of anthrax.

OCCURRENCE.

The disease usually occurs sporadically, but many cases have appeared in a short time, especially in stables where influenza and strangles have existed. The disease is of importance, on the one hand, because of its frequently fatal termination; and, on the other hand, by the very slow course and loss sustained by the continued disability of the patient for work.

ETIOLOGY.

Purpura hemorrhagica, with rare exceptions, develops as a secondary affection, as a sequel to diseases in which suppuration or necrosis of tissue have occurred in any part of the body; such

* Presented at 36th Annual Meeting of the Pennsylvania State Veterinary Medical Association.

diseases are especially strangles, pneumonia, pharyngitis, influenza, pyemia of the sinuses of the head, caries of bone, abscesses from any cause. All of these diseases are associated with the presence of microörganisms, and as the *Purpura hemorrhagica* sometimes occurs in the form of an enzoötic, it may be accepted that microörganisms are either directly or indirectly associated in the development of the disease.

The characteristic hemorrhages and serous exudations in disease indicate a severe affection of the vessel walls, which in all probability may be explained by the fact that chemical substances which circulate in the blood reduce the normal elasticity and resistance of the vessel walls. While this may be the result of a change in the blood, through which the nutrition of the walls of the vessel becomes diminished, and the watery consistency of the blood in itself facilitates the transudation of the blood plasma, a direct toxic action appears much more probable in consideration of the quick, sometimes very abrupt, hemorrhages and serous infiltrations.

Since, according to observations, pathogenic bacteria produce toxic substances, poison of similar origin may be suspected as the etiological factor of the disease.

According to Dickerhoff's conception, these toxins form in necrotic or suppurative lesions which develop in any part of the body through the action of the microörganisms during the course of the primary disease. This supposition is very probable, as the diseases preceding petechial fever, as a rule, are those in which the abscesses or gangrenous areas which develop in the course of the diseases communiate—either originally or later—with the outside world, whereby microöorganisms may readily gain entrance into the body. These organisms may then multiply in the exudates, or necrotic tissues, and produce chemical poisons which are later absorbed by the circulation. Accordingly, *Purpura hemorrhagica* should be considered as an infectious disease in which, however, the virus (probably the pyogenic streptococcus, which, because of its ubiquity, easily gains entrance into the necrotic tissue) exerts its pathogenic action indirectly with its specific toxic products.

SYMPTOMS.

The disease usually commences with the appearances of small punctiform or linear hemorrhages in the nasal mucous membranes. In some instances the animals do not evidence any dis-

turbed state of health, neither lose desire for food; only manifesting slight dullness and depression.

Immediately after the appearance of hemorrhages in the nasal mucous membranes, swelling of the skin and the subcutaneous connective tissue make their appearance. In some cases numerous urticaria-like vesicles develop over the entire body, which disappear after a short time or coalesce, forming larger areas of swelling. These swellings often grow rapidly, assuming great dimensions. In severe cases the circumference of the extremities becomes enormous, so much so that the legs from the elbow to the foot swell to two or three times their natural size. On the head the swelling first affects the alæ of the nose and the lips, soon the lower part of the face and then the fore part of the head; in fact, assuming the size of or resembling the appearance of a rhinoceros.

The skin over the swellings becomes stretched so that a yellow serum oozes out, which later dries and forms a crust. The swellings of the legs impair the physiological functions and mobility of the affected part of the body.

When the swelling extends to the folds of mucous membranes of the larynx, then the animal will show indications of inspiratory dyspnœa, and finally asphyxiation may result.

In severe cases disturbances of the digestive tract are noticeable, which are due to involvement of the mucous membranes of the stomach. Symptoms of colic sometimes follow the severe changes, and these indicate hemorrhages of the intestinal walls. In case of severe inflammation of the bowels profuse diarrhœa appears and may continue, causing the death of the animal.

COURSE.

The course of *Purpura hemorrhagica* varies from the very mild form causing petechiæ of the nasal mucous membranes and small swellings of the skin, urticaria-like in character and running its course in three or four days, to the extreme distortion of the body and resulting in death from asphyxiation or sepsis.

In favorable cases the swellings, after reaching a certain degree, retrogress rapidly or gradually. Sometimes, however, the improvement is only temporary and the conditions become again aggravated and in this way the disease runs a course of eight or ten weeks. After some of these necrotic areas form it requires considerable time and treatment until the normal function and appearance are restored to the animal.

TREATMENT.

Symptomatic treatment has a great influence on the further development of symptoms and on the termination of the disease, especially as you are frequently called upon to avert asphyxiation.

It is of very great importance to secure suitable food for the affected animal and plenty of fresh water with hydrochloric acid in it. If difficulty in masticating, then give green food, bran, gruels, etc. Plenty of fresh air; in fact, if a pasture can be secured for the animal, by all means do so, for when the patient can move around in the pasture and eat the grass, recovery is then very speedy.

Wounds, ulcers and abscesses require antiseptic and surgical treatment. When you have swelling of the nasal membranes the nasal cavities must be cleansed with a weak antiseptic solution two or three times daily; 2% Lugol's solution, creolin, lysol or alum, each, should be of a mild, non-irritating solution.

The superficial swellings may be bathed with spts. camphor, spts. turpentine, but I advise an unction pyroligneous acid, tr. iodine, and linseed oil. It is not as irritating as some of the watery solutions.

Internal Medication.—Potas. chlorate, tr. ferri chlor., spts. terebinth, spts. camphor, iodine, potas. bi-chromate, acid sulph., ac. hydro chl.

Tonics, and where abscesses are very pronounced, I give Donovan's solution.

SERUM TREATMENT.

Case No. 1.

Anti-streptococcus in streptococcus infection. Various authors use the serum for the treatment of *Purpura hemorrhagica* in horses, according to the prevailing idea that the disease is caused by a streptococcus infection.

The anti-streptococcus serum was used in a case of *Purpura hemorrhagica* affecting a bay mare, the sequel of a pharyngitis and which at first did not appear to be an aggravated case. The serum was used for three or four days; the edematous swellings of head, body and legs showed a very decided improvement. During this time the animal was in pasture throughout the day and stabled at night. Evidently the disease migrated to the digestive tract, causing colic, death ensuing after a few hours.

Case No. 2.

Bay Gelding.—Acclimated horse. No primary disease affecting this animal prior to the time my attention was directed to this animal for treatment.

The swellings of the head and abdomen were among the largest that I have ever seen during my practice. The abdominal swellings were punctured freely and great quantities of serum drained from these parts, with gratifying results. The swellings of the head were treated with an ointment composed of pulv. camphor, iodine crystals, and lard. This combination I have used in other cases with best of results. Anti-streptococcus serum was used.

Case No. 3.

Bay Gelding.—This animal not known to have any previous sickness. Upon examination of the nasal mucous membranes found extravasations of blood with dejected appearance, stiffness upon movement, in a few days swellings forming and kept getting larger, head becoming larger and post-pharyngeal swellings increasing to such an extent that dyspnœa became so pronounced that asphyxiation was threatened, and tracheotomy was performed at 2 a. m., giving immediate relief. Swellings around the ankles became enormous, so that the skin broke, forming deep fissures and sloughing. However, animal was forced out into a pasture and this was, to my mind, the best treatment, since recovery began from this date.

Case No. 4.

Black Gelding.—Purchased in March with twenty other animals; several of these animals had shipping fever, influenza and laryngitis. This animal showed no infection whatever, was in the best physical condition, shiny coat, good flesh, looking in perfect health, suddenly became dull, and nasal mucous membranes showed extravasations of blood; head and legs becoming swollen, abdominal dropsy, sheath enormously swollen, quite a large abscess of the extensor group of muscles on the left fore leg; also abscesses on both posterior legs above the hocks between the gastrocnemius—flexor pedis perforans, flexor pedis perforatus—large amounts of necrotic tissue were discharged from both and, while the abscesses were so large the animal remained almost immobile, eating practically nothing for eight or ten days, finally cob corn was given in small quantity with the idea that probably it would help strengthen the animal, which it did, and finally

the horse began feeding and improving and after four months was again looking quite like himself. This animal was given ounce doses daily of Donovan's solution, also Elix. iron, quinine, and strychnine, half-ounce doses twice daily.

These are a few of the cases treated since I have been engaged in practice, and I desire to state that some of the cases treated were extremely severe in character, and there is no doubt in my mind that if I would not have had an opportunity of putting the animals in pasture, 40% more would have died. Where I have been favored with a pasture, I am confident that the death rate has not been 10%. The last five cases I have been called upon to treat happened during the summer and as soon as diagnosis was made the animals were turned into the pasture and all made quick and good recoveries.

OBSERVATIONS AND RESULTS OBTAINED IN TREATING CATTLE FOR STERILITY.*

Benjamin Price, West Chester, Pa.

In presenting this paper on the subject of Observations and Results Obtained in Treating Cattle for Sterility to the members of the State Veterinary Medical Association, I feel that my observations and results are both too limited to be worthy of much consideration by the profession.

However, it is not always the contents of a paper that accomplish much good, but more frequently the general discussion following which brings out the experience and results of several interested in the same line of work.

It is just such offerings and expressions of accomplishments and results when considered or combined permit us to arrive at final conclusions worthy of recognition and so valuable in obtaining improved methods and better results, not only for ourselves and our clients, but for the enlightenment and betterment of our chosen profession.

It is with the hope of producing such a discussion among you today that I have consented to submit a few of my own personal results and conclusions.

Sterility exists in alarming numbers of cows, and I think it can be safely said, has been on the increase instead of the decrease for the past few years.

* Presented at 36th Annual Meeting of the Pennsylvania State Veterinary Medical Association.

This condition of affairs is probably due to several factors, some of the most common being present stabling methods of crowding greater numbers into lesser space, combined with heavy feeding of rations containing larger quantities of concentrates which naturally overtax every internal organ. This practice, with little or no exercise, would hinder and lessen the fecundity of everything.

The chief cause or causes, however, is the increasing prevalence of granular vaginitis and abortion, a disease to which a very large percentage of the existing sterility is due.

I am satisfied that about 75% of the sterility in cows is due either directly or indirectly to the bacillus of abortion; the genital organs frequently becoming so diseased that conception is impossible for many months.

Then, too, after pregnancy exists the fœtus is expelled at such an early date and with so little apparent external manifestation that it goes by unnoticed by the herdsman and the cow is recorded as sterile.

Sterility is frequently due to the very common condition, metritis, and its sequel, pyometra, either of which have produced countless numbers of sterile cows, and it is rather annoying to think that we as practitioners were indirectly to blame for our inability in treating diseases of the uterus in a practical way after the os-uteri had partially closed.

Present-day efficiency lies principally in our ability to prevent disease rather than in our success in curing it. This applies particularly well to sterility.

It is most gratifying to feel that at the present time we have a treatment for disease of the genital organs that is undoubtedly effective in making sterile cows breeders, but, better yet, is invaluable in preventing the cows from becoming sterile.

In my remarks I have reference to the Albrecktsen treatment for sterility and abortion, a procedure of unquestionable financial benefit to both the veterinarian and dairyman, as well as being a most professional procedure in its application.

Until the introduction of this treatment, the veterinary practitioner in general pulled off more fake stunts in his almost futile treatments for sterility than in any other line of his work.

How often would he have been embarassed had the owner known how very little good was actually accomplished either by instrument or by hand in dilating the rigid os.

With this treatment, one painting of the canal with Lugol's solution of iodine will in two or three days relax an os that will hardly permit the entry of the dressing forceps to the extent of the easy passing of a catheter the size of one's finger.

After using this treatment for abortion and sterility continually—yes, I might say almost daily for the past three years—I am satisfied to make a few statements that may be of interest to some of you at least.

This treatment can very profitably be used on all cases of metritis and pyometra, no matter what the cause may be. This will save the owner many times the veterinarian's fee in placing his cow in a healthy condition in one-fourth the time, frequently avoiding prolonged and occasionally fatal cases of septicemia.

In cases of retention of the afterbirth, it is good economy from the owner's standpoint to treat every cow in from four to seven days after the removal of the membranes. No matter what the external appearances may denote, this practice, combined with the proper treatment of all cows which abort or are affected with either metritis or pyometra, will, in my judgment, prevent at least 75% of the cases of sterility among cows.

This feature alone is worth dollars to the dairy industry. No dairyman can argue that the treatment does not pay. The amount of extra milk alone which will be received by avoiding prolonged cases of septicemia will pay the doctor bill, the fewer cases of sterility and the greater advantage of being able to safely breed his cows in one-third less time, as was formerly recommended after abortion or metritis, is a great gain. This is particularly true to the breeder of pure-bred stock.

In using this treatment in a certified herd of eighty-five head during a period of three years, we have had the following results: Ten cows treated for sterility during first year all conceived except two, both of which had granular vaginitis or pyometra of long standing.

During the same year sixteen cows aborted in an interval of six weeks. All were isolated and treated. Fifteen had conceived with two or less services, one was re-treated after third failure and readily bred. During the second year it was necessary to treat three cows for sterility and three cows aborted, two of which were heifers carrying their first calves. Every cow in this herd was given the treatment prior to being bred, and it is rather remarkable that so far this season (and about one-half the cows have freshened) there has been but one dead calf and one reten-

tion of the placenta. The calves have been more vigorous and healthy and the owner is an enthusiastic booster.

In another large herd treated there were six cows which had been served regularly for a period of over one year. While treating four other cows which had gone from six to nine months, I suggested to the owner treating all the winter cows—thirty-five head—which was done.

Of the ten sterile cows, five bred after the first three treatments, the remaining five were re-treated and two bred; the other three never will breed, as they were milked out and fattened. Of the thirty-five cows treated for no cause, all carried mature calves except two—one a dystokia, the other dead-born. It is interesting to note that of the thirty-five head only two required the removal of the retained placenta.

In other large herds, where the treatment has been extensively used, the results have been most gratifying, and if time permittd we might discuss many more interesting case reports, some of successful termination and others different, but it is most gratifying to me to state that slightly over 60% of the cows treated for sterility have become breeders with the application of three treatments. Of the remaining 40% nearly 10% responded and conceived after receiving two or three more treatments.

The remaining 30%, the cause of the sterility was usually traceable to diseased conditions of the ovaries or uterus or probably some malformation of the genitals.

Regarding the application of the treatment, there is little need of an amateur occupying much of your time except that I want to state that after trying out nearly all of the available and feasible antiseptics, I am convinced that with this treatment Lugol's solution of iodine has given me the best results. It is non-poisonous, of undisputed antiseptic and germicidal value, it is in a 1% to 2% solution, just sufficiently stimulating to produce an increased blood supply to the more superficial layers of the lining membrane, and yet not sufficiently irritating to produce any inflammation or discharge.

The freshly stimulated and invigorated lining membranes are in a much more receptive condition for the fertilized ova than are those of the non-gravid uterus, which, if untouched, is always coated with a gelatinous exudate and to the eye has a most dormant, unfertile appearance.

The Albricktsen treatment applied before breeding is of marked benefit to all cows, the result being quicker and easier

conception, with fewer cases of retained placental membranes, and more vigorous calves at time of birth.

In my practice during the past season there have been fewer cases of sterility than in previous years. This I attribute to the fact that all cows which abort and which retain the afterbirth or have any pyometra are given the treatment, and by following this method I am convinced that sterility among cows can be reduced 75%, and the cows can be bred in from one to three months earlier than those not treated.

The veterinarian realizes that tuberculosis produces greater annual losses to the stock industry than any other disease, but it is hard for many farmers to see.

When from 10% to 35% of a herd abort within a year, and the half of them will not breed, it takes only a schoolboy's calculation to figure in dollars and cents the actual loss occasioned by abortion and sterility.

It is my prediction that within the next few years this treatment for these ailments will be acclaimed as great a financial asset to the dairy industry as is the present treatment for parturient-paresis.

BLACKLEG AGGRESSIN.*

HERBERT C. WARD,
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For more than a century men have known something about a disease called Blackleg. Over forty years ago the specific agent was discovered and for thirty years cattle have been successfully protected against this infectious plague. Before practical methods of immunity were discovered tremendous losses, ranging from 5% to 25%, occurred among the young stock in certain areas of world-wide distribution. Vaccines reduced these losses to 1% and even less. But to the stockowner as certainly as to the public welfare the loss of even 1% of such live stock wealth is still a most serious economic burden. Therefore we understand why men have been stimulated to improve their methods in the manufacture of an ideal vaccine. The crude vaccines of the past have rendered historical service, but today we have hope of greater efficiency in a new and better method.

* Paper read before the Southeastern Michigan Veterinary Medical Association.

Attenuated vaccines were made both from diseased tissues and from pure cultures. Their protective values were determined upon tens of thousands of cattle in the afflicted districts, as well as upon experimental animals of the laboratory. Naturally, the most successful vaccines became more and more extensively employed. But failure following applications in their use were continually suggesting the need of an improved and safer protection. Vaccines were subject, therefore, to new processes of attenuation. Animals were injected in different portions of the body, and efforts were made to improve these immunizing substances.

This effort to secure a more satisfactory vaccine has brought us to the present consideration of a group of blackleg immunizing products known as aggressins.

Inquiry as to the exact meaning of aggressin informs one that this term has been used to express a theoretical course of immunity reaction when a bacterial exudate is injected into the living body. Bail reported that exudates from infective processes produced an active immunity against the original excitant of the specific disease. His further observations led him to report that the leukocytes were inactive, being destroyed or held back by some potent force in the exudate; so that in the absence of these cells the blackleg or other bacilli were able to rapidly multiply and complete for that animal the course of a natural infection. According to his opinion, then, this potent force in bacterial exudate is active, offensive, destroying somewhat the resident defenses of the body. This action is due to some toxic substance produced by the blackleg organism as it develops in the tissues during infection. Because these exudates possess this aggressive power they have been popularly termed aggressins.

Let us take, therefore, a small amount of the exudate from the muscle of a bovine dead of blackleg in the field and inject this into a healthy animal. What happens? The aggressin clears the way for a free, unrestrained development of the blackleg organism and the animal sinks before the onslaught of an acute infection.

When we remove the living virus, filtering out the spores and bacilli from this exudate, no such infection develops, no local or general reaction occurs. Therefore if toxic principles are produced, they exist only in physiological proportions. Exposing a treated animal later to blackleg virus no infection follows in the presence of an active immunity. For a short and rather indefinite period following treatment with this germ-free exudate, or

aggressin, calves become highly sensitive to blackleg infection, and if exposed to a natural infection or to experimental virus will die as though untreated. This hypersensitive condition passes away in a few days and it is then practically impossible to produce blackleg with even a double dose of experimental virus.

Repeated demonstration of the practical truth of these results underlies our success in immunizing susceptible animals with blackleg aggressin.

Aggressins were first used experimentally on laboratory animals by Bail and were obtained by pipetting off the peritoneal exudate from his infected animals. Schobl, acting on Bail's suggestive work, first experimented with blackleg aggressin on guinea pigs. To secure his exudates he injected guinea pigs subcutaneously and at the climax of the infection withdrew the tissue juice, centrifuged it, and shook with toluol. The clear liquid was then tested free of bacteria. This immunized guinea pigs against a virus successfully after a ten-day period.

For large amounts of aggressin he injected a calf with blackleg tissue virus and obtained the edematous extract. This was then centrifuged clear and preserved with toluol. After filtration through Berkefeld it was proved to be germ-free by both cultural and animal tests.

More recently R. A. Kelser reported his method of manufacturing blackleg aggressin. Animals received muscle virus intramuscularly and following death the edematous fluid and affected muscle tissues were collected, mixed, and ground up. This mixture was then frozen and left for a few hours, after which thawing was facilitated and the filtrate obtained by pressing and filtering. His product was found to possess the same immunizing properties as discovered by Schobl.

The commercial processes of manufacturing wholesale amounts of blackleg aggressin vary only in mechanical details. Susceptible animals are subjected to fatal artificial infection with muscle virus or cultures. A few hours after death the hair and hide is removed, the edematous juices collected and the affected muscle tissues excised and pressed until all the liquid has been obtained. This is filtered and preserved until free of all viable cells and spores. After double testing by sterility and safety trials this filtrate is delivered to the market as germ-free blackleg aggressin.

When we seek for a demonstration of the protective value of blackleg aggressin it can be found in the report of Schobl, who used successfully both guinea pigs and calves. His results are quoted in the following Table No. 1.

TABLE No. 1.

AGGRESSIN IMMUNITY TESTS BY O. SCHOBL.

Animal Groups	*Aggressin*	*Time Before*	*Infection With*	*Results*	
Guinea Pigs No. 1	0.5 mil.	0	B. S.	.....	Died
2	0.5. mil.	0	"	.....	"
" 1	1.0 mil.	2 days	Exudate	.....	Died
2	1.0 mil.	"	"	.....	"
3	0	"	"	.....	"
4	0	"	"	.....	"
" 1	1.0 mil.	4 days	Exudate	Lived	.....
2	1.0 mil.	"	"	"	.....
3	0	"	"	.....	Died
4	0	"	"	.....	"
" 1	0.5 mil.	6 days	Meat	Lived	.....
2	0.5 mil.	"	"	"	.....
3	0.5 mil.	"	"	"	.....
4	0	"	"	.....	Died
5	0	"	"	.....	"
" 1	0.5 mil.	10 days	Exudate	Lived	.....
2	0.5 mil.	"	"	"	.....
3	0	"	"	.....	Died
4	0	"	"	.....	"
" 1	0.5 mil.	21 days	Meat	Lived	.....
2	0.5 mil.	"	"	"	.....
3	0	"	"	.....	Died
4	0	"	"	.....	"
" 1	1.5 mil.	51 days	Meat	Lived	.....
2	0	"	"	.....	Died
3	0	"	"	.....	"
Heifers No. 4	5.0 mil.	10 weeks	Meat Virus	Lived	.....
5	7.0 mil.	2 weeks	"	"	.....
6	0	.....	"	.....	*

*Died from acute infection.

His study showed that animals were not protected immediately following aggressin injection. After three days a developmental immunity was established and remained active as long as the tests were continued.

Kelser failed to demonstrate satisfactorily immunity values when he used guinea pigs, but his results with calves were excellent, and are quoted in the following table.

TABLE No. 2.

Animal	Aggressin	Time Before	Infection With	Results	
Calf No. 1	5 mils	14 days	Muscle virus	Lived	.....
2	5 mils	"	"	"	.....
3	0	"	"	.....	Died
4	0	"	"	.....	"
5	0	"	"	.....	"
6	0	"	"	.....	"
1	5 mils	$5\frac{1}{2}$ months	Muscle virus	Lived	.....
2	5 mils	"	"	"	.....
3	0	"	"	.....	Died
4	0	"	"	.....	"
5	0	"	"	.....	"
6	0	"	"	.....	"

These findings indicate perfect protection and permanency of the acquired immunity. It is important to call attention to the fact that the treated animals were not infected until after a period of fourteen days.

With the suggestive results already reported in mind, we applied the same kind of tests upon blackleg aggressin as it is being placed on the market today. The following tables represent the results of our experimental studies.

TABLE No. 3.

Animal	*Dosage*	*Time Before*	*Infection With*	*Results*	
Guinea Pig 1	1. mil.	1 day	Muscle virus No. 4	Lived	.....
2	1. mil.	"	"	.....	Died
3	Control	"	"	.....	"
" 1	1 mil.	2 days	"	Lived	.....
2	1 mil.	"	"	.....	Died
3	Control	"	"	.....	"
" 1	1 mil.	3 days	"	Lived	.....
2	1 mil.	"	"	"	.....
3	Control	"	"	.....	Died
" 1	1 mil.	4 days	"	Lived	.....
2	1 mil.	"	"	"	.....
3	Control	"	"	.....	Died
" 1	1 mil.	6 days	"	Lived	.....
2	1 mil.	"	"	"	.....
3	Control	"	"	.....	Died
" 1	1 mil.	7 days	"	Lived	.....
2*	1 mil.	"	"	"	.....
3	Control	"	"	.....	Died
" 1	1 mil.	8 days	"	Lived	.....
2*	1 mil.	"	"	"	.....
3	Control	"	"	.....	Died
" 1	1 mil.	10 days	"	Lived	.....
2	1 mil.	"	"	.....	Died
3	Control	"	"	.....	"
" 1*	1 mil.	12 days	M. virus also culture	Lived	.....
2*	1 mil.	"	"	"	.....
3	Control	"	"	.....	Died

A few animals died from mixed infections and in all such sets* duplicate trials were made with satisfactory results. Careful checks were made of every animal dying under tests. The above results constitute, therefore, a demonstration of the protective value of blackleg aggressin against blackleg experimentally produced in guinea pigs. This protection did not appear to have developed until the third day.

Before proceeding to the test on bovines it was necessary to gauge as near as possible the cultural virus and in order to demonstrate viable pathogens in the culture virus recourse was made by subjecting guinea pigs to graded doses. The results of such a titration are to be seen in Table 4. All animals were posted and the purity of the virus established microscopically and culturally.

Table No. 4.

VIRUS NO. 7 TITRATION.

Animal No. 1	Rec. Subc.	1.0 mil	Virus No. 7	Dead in 18 hours
Animal No. 2	Rec. Subc.	0.5 mil	Virus No. 7	Dead in 18 hours
Animal No. 3	Rec. Subc.	0.2 mil	Virus No. 7	Dead in 18 hours
Animal No. 4	Rec. Subc.	0.1 mil	Virus No. 7	Dead in 18 hours

VIRUS NO. 3 TITRATION.

Animal No. 1	Rec. Subc.	1.0 mil	Virus No. 3	Dead in 16 hours
Animal No. 2	Rec. Subc.	0.5 mil	Virus No. 3	Dead in 16 hours
Animal No. 3	Rec. Subc.	0.1 mil	Virus No. 3	Dead in 32 hours
Animal No. 4	Rec. Subc.	0.05 mil	Virus No. 3	Dead in 38 hours
Animal No. 5	Rec. Subc.	0.01 mil	Virus No. 3	Sick (?)
Animal No. 6	Rec. Subc.	0.01 mil	Virus No. 3	Sick (?)

Both strains of the blackleg virus were active, therefore, in doses of 0.1 mil or less for guinea pigs.

Such a titration was used as a guide by which the dosage for bovines could be determined. The final dosage was set at 5 mils and used as stated in the following tables. Virus No. 7 was used on the first three heifers, Table No. 5, and Virus No. 3 on the last three, Table No. 6.

Table No. 5.

AGGRESSIN IMMUNITY TESTS ON BOVINES.

Heifer	*Immunized*	*Method*	*Aggressin*	*Inoculated*	*Method*	*Virus*	*Result*
No. 1...	2-5-19	Subc.	10.0	2-19-19	Subc.	5.0	Lived
No. 2...	"	"	5.0	"	"	5.0	Died
No. 3...	"	"	0.0	"	"	5.0	"

Heifer No. 1.—No reaction local or general.
Alive and in good condition, April 1st.

Heifer No. 2.—After 24 hours temp. normal, but local swelling.
After 36 hr. temp. subnormal, swelling developing.
Dead in 40 hours. P. M. Typical Blackleg.

Heifer No. 3.—In 24 hours temperature was 104.4 and quarter badly swollen, animal down. Dead 30 hours. P. M. Typical Blackleg.

The aggressin injections were made subcutaneously in front of the shoulder. Virus injections were made subcutaneously in the right leg.

Table No. 6.

AGGRESSIN IMMUNITY TESTS ON BOVINES.

Heifer	*Immunized*	*Method*	*Aggressin*	*Inoculated*	*Method*	*Virus*	*Result*
No. 4...	2-5-19	Subc.	10.0	3-8-19	Subc.	4.0	Lived
No. 5...	"	"	5.0	"	"	4.0	Died
No. 6...	"	"	0.0	"	"	0.0	"

Heifer No. 4.—No reaction local or general.
Alive and in good condition April 1st.
Heifer No. 5.—After 24 hours, temperature normal, but local swelling
After 36 hours, temperature normal, but quarter swelling.
Dead in 40 hours. Post mortem—typical blackleg.
Heifer No. 6.—After 18 hours, temperature subnormal, swelling extensive.
Dead in 24 hours. Post mortem—typical blackleg.

The results thus obtained from the most recent experiments show clearly the protective value of aggressin against highly active blackleg virus. The virus dose proved to be altogether too high in spite of the attempt to gauge its virulence. There was no question but that the low aggressin animals possessed a positive degree of immunity. Careful post-mortem studies demonstrated that the infection was much less extensive as compared with the control infection, amounting to about one-fourth that of the unprotected animal. In addition, cultures were obtained from every portion of the body in the normal heifers, but only from the original site of injection in the aggressin heifers. Likewise, the controls all died early and symptoms were more typical. In view of the consistency of the clinical, cultural and pathological pictures, the conviction is firmly accepted that a lethal dosage would have demonstrated perfect immunity in all grades of protected animals.

Encouraging reports are rapidly accumulating in the practical field, giving to the experimental studies a new meaning and stimulating research effort like mental aggressins—making way for success.

THE BLOOD PRESSURE OF THE HORSE.

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The determination of the blood pressure is a valuable adjunct in diagnosis in the practice of human medicine. This usually is accomplished by the application of a sphygmonanometer to the upper arm of the patient and requires but a moment. No use has been made in veterinary practice of this index to a patient's condition, therefore it appeared that this might be a fruitful field for investigation.

It was found that by applying the sphygmomanometer to the tail of the horse, mule or ox readings of the blood pressure in the caudal arteries could be taken. The work here presented is confined to the horse, however. The first problem presenting itself was the determination of the normal blood pressure. To this

end 130 horses of all ages, both sexes, of various weights and states of condition as to flesh were examined. Full descriptive records were kept of each case, together with a record of rates of pulse and respiration and the temperature. The data was then subdivided in a suitable manner, analysis made, and averages deducted, the methods and results of which are herein reported. In later work it will be attempted to show the modifications of blood pressure that occur in various pathological conditions.

TAKING THE BLOOD PRESSURE.

The sphygmomanometer consists of a soft rubber bag covered by a band of silk which constitutes what is called a cuff; a rubber bulb for inflating the bag; and a pressure gauge. The gauge is constructed to register pressure corresponding in terms of millimeters to the heights of the column of mercury which the given pressure would support or counterbalance. In taking the blood pressure of a horse the cuff is wrapped on to the lower extremity of the upper third of the tail. This point is chosen as being most convenient and yielding the best results. If the cuff be placed too high it tends to slip down and there is apt to be interference by pressure on the buttocks; if placed too low the readings are erratic. This matter is discussed further in the section

FIGURE I.
The Sphygmomanometer:
1. The cuff. 2. Gauge, or manometer. 3. Bulb.

on variations and errors. The bulb and gauge are then attached to the cuff by rubber tubing which communicate with the interior of the soft rubber bag. The cuff is now inflated until sufficient compression of the caudal arteries is effected so that visible fluctuations of the dial hand of the pressure gauge or manometer occur at each pulse beat. A reading of the manometer is made under these conditions and this is taken to indicate the diastolic pressure. The cuff is now inflated until pressure upon the caudal arteries is just sufficient to shut out the pulse wave completely, so that no movements of the dial hand occur.

FIGURE II.
Taking the Blood Pressure.

A reading of the pressure at this point is also made and it is taken to indicate the systolic pressure. In practice, in taking the pressure the cuff is inflated somewhat above the true diastolic or systolic levels and then some of the air is gradually permitted

to escape until a delicate adjustment is reached. The diastolic pressure is subtracted from the systolic and the difference is regarded as the pulse pressure.

THE MECHANICS OF ARTERIAL BLOOD PRESSURE.

A brief review of certain facts pertaining to the mechanics of the physiology of circulation may be in order so that we have clearly in mind the factors by whose operation blood pressure is produced and maintained. The application of the terms diastolic and systolic to the blood pressure will also be reviewed. We shall not enter into a discussion of the nervous mechanism which controls and regulates the level of pressure maintained; the reader is referred to text-books on physiology for a discussion of this point.[1] We may also exclude a consideration of the venous system, for it is only the arterial blood pressure that we are interested in at this time. The functioning of the heart, arteries, arterioles, and capillaries in their relation to blood pressure is therefore the point at hand.

The arteries comprise a set of elastic and contractile tubes; during life they are always moderately distended by the blood contained in them. At each pulsation of the heart more blood is forced into the arteries, which tends to increase the amount of blood contained, to distend the vessels still further; thus increasing the internal pressure. Thus all other factors remaining constant an increase in the output of blood from the heart will cause a rise in blood pressure. This increase may be caused in two ways: (1) An increase in the rate of heart beat. (2) An increase in the force of heart beat. The influence of an increase in the rate is readily apparent. In considering the effect of an increase in the force, it should be borne in mind that the ventricle does not necessarily empty itself completely at each pulsation; the degree to which it does empty itself is dependent upon the force of the contractions of the heart muscle. Thus rapid, forcible contractions of the heart increase the output of blood and tend to increase the blood pressure. Conversely slow, feeble heart action lessens the output and tends to decrease the blood pressure in the arterial system.

The blood constantly escapes from the arterial system by way of the arterioles, which lead to the capillaries. The arterioles are relatively small in diameter and offer resistance to the free escape of blood by virtue of the friction which is induced by the flow of blood through them. Were this factor of friction absent

the arteries would discharge at each beat of the heart a quantity of blood equal to that which they receive. However, due to this peripheral resistance, all the blood that enters the aorta at systole of the ventricle does not immediately escape; it is dammed back into the arteries and dilates them, increasing the blood pressure. During diastole and pause of the heart the elastic rebound of the artery walls continues to force the blood on, the arteries partially empty themselves and the blood pressure falls. The calibre of the arterioles is controlled by the vasamotor nerves. When these vessels are constricted they offer more resistance to the flow of blood through them as friction is increased; thus more blood is held back in the arterial system and the blood pressure rises.

On the other hand, if they be dilated there is less peripheral resistance, the arteries more completely empty themselves during diastole and the period of pause and the blood pressure falls.

It will be seen from the foregoing that the blood pressure varies for the individual at each beat of the heart. The high level of pressure reached during systole of the heart is termed the systolic pressure. The low pressure found during diastole and pause is termed the diastolic pressure. The difference between the two is the pulse pressure; the greater the difference, therefore, the higher the pulse pressure. The pulse pressure then is a measure of the force of the elastic rebound of the arteries available for the propulsion of the blood while the heart is at diastole and pause. It tends to be high when there is a low peripheral resistance or a forceful heart beat. Under these conditions the arteries most completely empty themselves between heart beats or again are most markedly distended by the inrush of a large quantity of blood at each pulsation of that organ. Low pulse pressure will be found in those cases where there is a high peripheral resistance or a feeble heart beat. This follows from the fact that under these conditions the blood pressure remains relatively high during diastole and pause or is but slightly augmented at systole; the difference between diastolic and systolic pressure thus is small and the pulse pressure is low.

There is still some difference of opinion as to whether the use of the sphygmomanometer gives the true diastolic and systolic values. Brooks and Luckhart[2] have shown quite conclusively by means of models that simulate the conditions found in the body that the values so obtained are above the true pressure. This, however, is not a serious matter, since we are merely interested

in obtaining the normal mean as indicated by the method employed. If the same method is then applied in clinical cases variations from the normal will be just as apparent if the readings taken give relative values as if the absolute pressures were determined.

SOURCES OF VARIATION AND ERROR.

Certain unavoidable sources of variation and error in taking the blood pressure readings are pertinent.

(1) The values secured vary with the position of the cuff on the tail. The higher up the cuff is placed the higher the systolic and the lower the diastolic values obtained. Attention is here called to Table I, which shows the values obtained by shifting the position of the cuff. The blood pressure was taken of five different animals; first the cuff was placed on the root of the tail against the body, then in the middle of that structure and also on its inferior extremity. Readings were taken in each position. It is seen that when the cuff was placed on the root of the tail lower systolic and higher diastolic values were obtained than were found at the middle of the tail in the same animal. When the cuff was placed on the lower extremity no fluctuations of the dial hand of the gauge occurred at any pressure; thus no readings could be taken.

TABLE I.

BLOOD PRESSURE AT DIFFERENT LEVELS OF TAIL.

DIASTOLIC PRESSURE.

Case No.	At Root	At Middle	At End
1	20	32	No readings
2	16	46	No readings
3	24	50	No readings
4	32	78	No readings
5	26	80	No readings

SYSTOLIC PRESSURE.

Case No.	At Root	At Middle	At End
1	132	90	No readings
2	124	98	No readings
3	114	98	No readings
4	134	98	No readings
5	164	130	No readings

This factor of variation is more serious in the equine than in the human subject because the caudal arteries narrow more abruptly and come to the terminal arterioles more quickly than the brachial when the regions at which the pressures are taken are compared. In securing the data herein presented the cuff was placed as uniformly as possible on the lower end of the upper third of the tail. In compiling the statistics and making analyses to determine the influence of age, weight, condition and sex, records of which did not appear to be representative, *i. e.*, those that had the characteristics of improper placing of the cuff were omitted.

It appears, however, that in practice this need not be a serious source of error if the clinician keeps in mind the manner in which the position of the cuff affects the pressure readings. Thus allowance can be made and a proper interpretation applied.

(2) The gauge probably does not respond equally delicately to slight impulses at all times. This is true generally of any delicate mechanism. A slight amount of inertia and friction must be overcome at each pulsation of the arteries to produce fluctuations of the hand on the dial. Each instrument would probably also have its own level of accuracy in this respect. However, an analysis of the blood pressure herein reported shows that the normal pressure probably may vary to the extent of 10 mm. Hg.; thus an error in reading of 2 to 4 degrees too high is not highly material from a clinical standpoint.

(3) The same person will at times make closer readings than at others. This is the individual personal factor. It is well known that we are not at all times equally patient and observant. Fluctuations on the gauge when extremely minute that sometimes would be recorded are at other times overlooked. Conditions of light and of the control of the patient are important in their influence on this factor. The seriousness of this source of error lies within the control of the clinician and should on practice be minimized.

(4) Likewise no two persons would probably obtain exactly the same reading for a given patient. Still the difference should not exceed 2 to 4 degrees, which is well within the limits of normal variations of the pressure.

(5) The eye alone is the guide in obtaining readings. In taking the blood pressure of the human the finger of the clinician is laid upon the radial artery at the wrist or the stethoscope is applied at that point and by the feel of the pulse wave or by

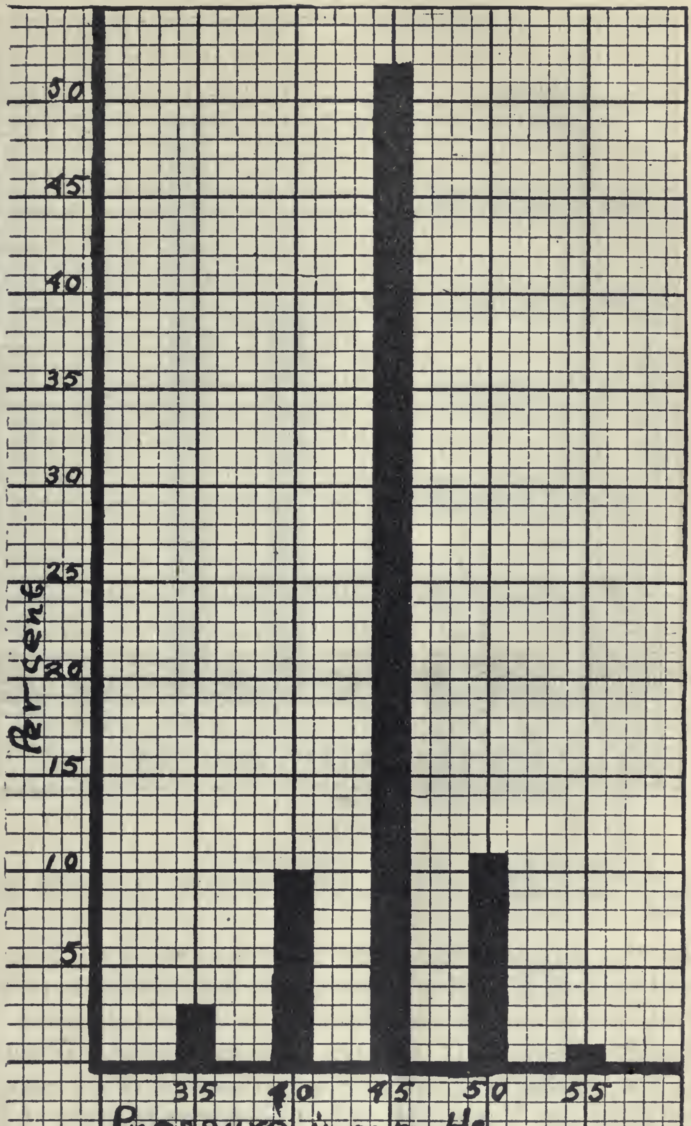
certain modifications of sound[3] as the pressure in the cuff is adjusted a means is at hand to check up on the values indicated by the gauge. In the horse, however, the pulse below the upper third of the tail cannot be felt, nor can sounds of arterial sources be heard that are of any value as a guide; the arteries lie too deeply and are too small.

(6) The patient, if nervous, will undergo changes in arterial pressure due to reflex stimulation while being examined. Excitement tends to cause an increase in blood pressure, probably chiefly due to the increased rate of heart beat that it induces. It is important that the clinician be also a good observer of the psychic reaction of the patient to being handled. Horses which forcibly depress the tail or make switching movements, step about restlessly, feint to kick, lay back their ears and bite at the stall do not yield reliable readings. The writer, however, had difficulty with only four or five animals out of 130 examined. The great majority of horses offer no resistance and remain quiescent if properly approached.

THE MEAN NORMAL BLOOD PRESSURE.

The deduction of the normal blood pressure of a species of animals depends upon obtaining readings on a number of normal animals and thereby establishing a mean. Two questions arise in each case considered: (1) Is this a normal animal? (2) Will this animal yield data suitable to apply in establishing a mean? The former question relates to the health of the animal, the latter to its excitability. Accordingly it was considered important to keep a record of each case examined as to: rate of pulse and respirations, temperature, physical condition, condition as to flesh, age, sex and weight. This data was later found very useful in making an analysis of the results.

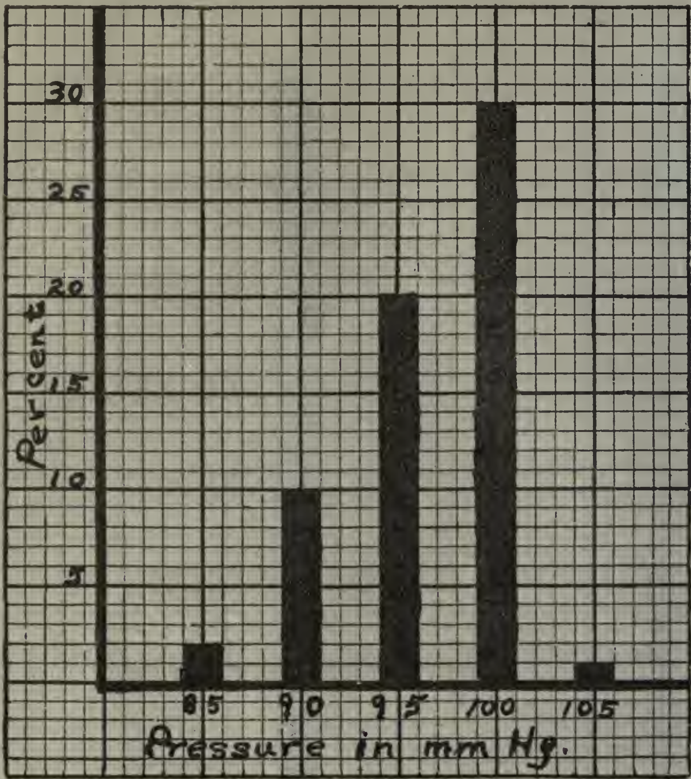
It was thought desirable first to determine the normal mean for all animals regardless of age, sex or condition of flesh. Only such animals as showed clinical symptoms of disease, temperature over 101.5 F. or abnormal rate of pulse and respirations were excluded. The maximum rate of pulse was taken as 46 for adults, 56 for 2 to 4 year olds, and 72 for 1 year old colts. Of the 130 animals examined only 100 were found to be normal according to these criteria. To merely compute the arithmetic mean of blood pressure from the records was not thought to be nearly as instructive as to construct a chart which would show between what levels the blood pressure of the majority of cases



GRAPH I.

DIASTOLIC PRESSURE.

The above is a reproduction of the significant part of the graph on diastolic pressure. Values are considered in round numbers, being reduced to the nearest figure ending in 0 or 5. Sventy-three percent of all cases are seen to fall 40 to 50 mm. pressure.

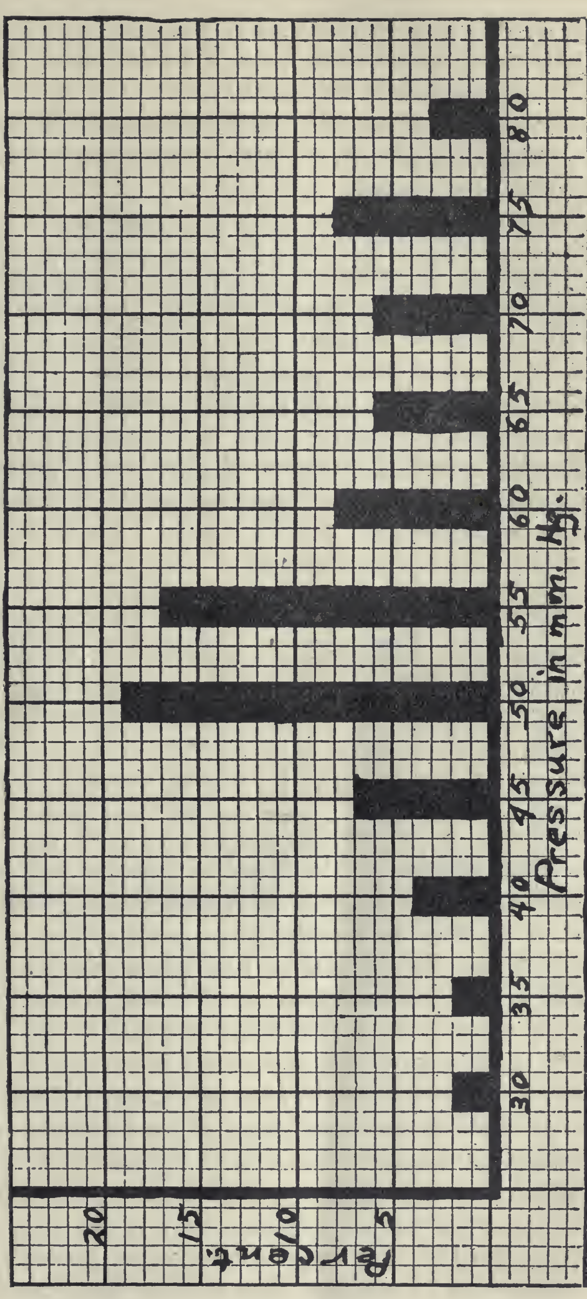


GRAPH II.

SYSTOLIC PRESSURE.

The significant part of the graph on systolic pressure. Values also reduced to nearest figure ending in 0 or 5. Sixty-nine percent of all cases are seen to fall between 90 to 100 mm. pressure.

falls; the arithmetic mean may be influenced to too great an extent by a few atypical cases and it does not show to what extent animals may be expected to vary from that mean. Accordingly, Charts I, II, and III were constructed. It will be seen that: (1) The diastolic pressure for 73% of all cases fell between 40 and 50 mm. Hg. (2) The systolic pressure of 69% of all cases fell between 90 and 100; and the pulse pressure of 66% was 40 to 70. Such a large preponderance of cases between these fairly narrow limits is rather indicative that they represent approximately the true values. If we had been able to exclude all physically or psychically abnormal animals and completely control all sources of error the percentages within these limits undoubtedly would have been much higher still.



GRAPH III.

PULSE PRESSURE.

Significant part of the graph on pulse pressures. Values are given in nearest figure ending in 0 or 5. Sixty-six percent of all cases fall between 40 to 70 mm. pressure.

In the remainder of the analyses it was therefore thought advisable to exclude from consideration all cases which presented either a diastolic pressure below 35 or above 55, or a pressure systolic below 85 or above 105 Such cases were suspected not to be in normal health even though they presented no other clinical evidences of disease.

THE INFLUENCE OF AGE.

In determining the influence of age on the blood pressure it was thought best to group the animals as: 1 year olds, colts; 2-4 year olds, adolescent animals; 5-11 years old, mature animals; and 12 or older, old animals. A sufficient number of colts below one year was not available to yield reliable results. The average diastolic and systolic pressure were now computed by taking the arithmetical mean; the number of cases within a group was found too small to apply the former method. The results were found to be as follows:

TABLE II.

EFFECT OF AGE ON BLOOD PRESSURE.

Age	Diastolic Pressure	Systolic Pressure	Number of Cases
1	44.8	105.1	6
2-4	43.4	99.9	22
5-11	42.1	102.5	54
12 or over	44.6	107.0	8

Very little variation in the diastolic pressure is seen. The systolic pressure, however, seems to be high in the young colt, is lower during adolescence and the prime years of life and again increases with age. This is in strict correlation with the behavior of the pulse rate at the various ages. It is well known by horsemen that the age of a horse from the standpoint of utility which is governed by his general health is determined more by the previous usage, care and diseases he may have suffered from at some time or other than by his actual years. Thus we would expect to find in the group of horses from 5 to 11 some prematurely aged animals which would bring the average for the group up higher than the true, representative level. That is the probable explanation for the fact that the average systolic pressure of animals between 5 and 11 is higher than that for those from 2 to 4.

THE INFLUENCE OF CONDITION AND WEIGHT.

Following similar means as employed in the determination of the influence of age, it was attempted to correlate condition as to flesh and blood pressure. Animals were arbitrarily classed as (1) poor, meaning those that were so devoid of adipose tissue as to appear bony and present figures showing some degree of emaciation; (2) fair, meaning those that showed no emaciation but appeared wiry and muscular; (3) good, which included those with rounded contours, giving indication of some padding of subcutaneous and intramuscular tissue with fat. The results are tabulated below.

TABLE III.

EFFECT OF CONDITION ON BLOOD PRESSURE.

Condition	Diastolic Pressure	Systolic Pressure	Number of Cases
Poor	40.6	98.2	10
Fair	43.2	105.5	36
Good	42.9	98.2	43

No satisfactory explanation appeared when these figures were taken by themselves, for they represented animals of all ages. When, however, a subsequent analysis was made in which only animals 5 to 11 years of age were considered and these were subdivided into horses in good condition above and below 1,300 pounds in weight and animals in poor to fair condition above and below 1,300 a rational explanation became apparent.

EFFECT OF WEIGHT AND CONDITION ON THE BLOOD PRESSURE OF HORSES 5 TO 11 YEARS OF AGE.

Below 1,300 Pounds.

Condition	Diastolic Pressure	Systolic Pressure	Number of Cases
Poor to Fair	43.1	106.5	29
Good	42.6	96.0	10

Above 1,300 Pounds.

Condition	Diastolic Pressure	Systolic Pressure	Number of Cases
Poor to Fair	*	*	*
Good	42.1	96.1	17

* Only one case.

It is seen that the factor of weight probably has little if any influence on the blood pressure of the horse as indicated by the groups of horses in good condition of flesh. The animals in poor to fair condition, however, show a higher systolic average than the corresponding group in good condition. On further search it was found that of the 27 animals in good condition only 5 showed a variation in either diastolic or systolic pressure greater than 10 mm. Hg. from the average of 40 to 50 mm. Hg. at diastole and 90 to 100 at systole. On the other hand, of the 29 cases in poor to fair condition 15 showed a greater variation than 10 degrees in either the diastolic or systolic pressure; of those in poor condition 5 out of 7 and of those in fair condition 10 out of 22 presented such marked variation. This probably means that among the animals in poor to fair condition we have a greater percentage of abnormal cases; that would account for the higher average of systolic pressures found in this group. Incidentally it is an indication that perhaps the blood pressure of the horse is greatly influenced by the health of the animal; later investigations may show that the determination of the blood pressure can be used as an aid in recognizing and diagnosing pathological conditions. It also shows that the diastolic pressure remains more constant even in cases of disease.

When we exclude all abnormal cases above referred to from both groups of horses we obtain results as follows:

TABLE IV.

EFFECT OF CONDITION ON BLOOD PRESSURE OF HORSES 5 TO 11 YEARS.

Condition	Diastolic Pressure	Systolic Pressure	Number of Cases
Poor to Fair	42.7	96.0	15
Good	42.2	95.7	22

Thus it would appear established neither that the condition of flesh *per se* nor the weight of the animal when uncomplicated by pathological conditions is an important factor in influencing the blood pressure of the horse.

THE INFLUENCE OF SEX ON THE BLOOD PRESSURE.

The probability that the condition of flesh is of slight importance as affecting the blood pressure is further brought out in the analysis to determine the influence of sex. In this case all

the mature animals were subdivided as to sex and condition. Again cases showing variations more than 10 mm. Hg. from the average limits were excluded. The averages found are here given:

TABLE V.

EFFECT OF SEX ON BLOOD PRESSURE.

Poor to Fair.

Sex	Diastolic Pressure	Systolic Pressure	Number of Cases
Male	44.0	93.3	6
Female	43.7	97.7	9

Good.

Sex	Diastolic Pressure	Systolic Pressure	Number of Cases
Male	43.5	94.7	11
Female	43.1	95.3	9

Grand Average.

Sex	Diastolic Pressure	Systolic Pressure	Number of Cases
Male	43.7	94.2	17
Female	43.4	97.1	18

The systolic pressure of females appears slightly higher, yet the difference is so small as not to warrant drawing positive conclusions. Yet should subsequent work substantiate the results here presented it would be wholly in accordance with the established fact that the systolic pressure of women tends to be higher than that of men.

A further point of interest is that of six pregnant mares examined five fell within the normal limits; the sixth presented a low—26 mm. Hg.—diastolic pressure. Pregnacy probably has little effect on the blood pressure, though the number of cases examined is too small to draw definite conclusions from.

CONCLUSIONS.

(1) The ordinary type of sphygmomanometer as used in human practice is applicable in taking the blood pressure of the horse, mule and ox.

(2) The normal diastolic pressure for the horse is from 40 to 50 mm. Hg. The normal systolic pressure is from 90 to 100.

(3) The systolic pressure is subject to the widest variation; the diastolic pressure is more constant.

(4) The systolic pressure is higher in the colt than in mature animals. An increase in blood pressure is common in old age.

(5) Females have a slightly higher systolic pressure than males.

(6) Weight and condition as to flesh seem not to have any noticeable influence upon the blood pressure.

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Acknowledgment is made to the coöperation of Drs. V. V. Brumley and J. U. Schoemaker, who were of aid in placing much clinical material at the writer's disposal.

STUDIES ON ANTHELMINTICS.

I. EXPERIMENTS WITH REPEATED DOSES OF OIL OF CHENOPODIUM.

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The superiority of oil of chenopodium as an ascaricide to other ascaricidal anthelmintics, when suitable doses of the involved drugs are compared, has been experimentally established for the dog by the work of Hall and Foster in the Bureau of Animal Industry, and of Hall in this laboratory, for swine by Hall and Foster (most of the work on swine was done by Foster),

*Resigned March 27, 1919.

and has been clinically established in the case of man by numerous observations of physicians here and in the tropics. In the case of the ascarid of the horse, Hall, Wilson and Wigdor found chenopodium superior to most of the drugs commonly used, and work by Hall, Smead and Wolf, to be published in a paper in this series, shows carbon bisulphid superior to chenopodium.

The therapeutic dose of oil of chenopodium for removing ascarids from dogs has been found by the writer to be 0.1 m. p. k. (mil per kilo). In this dosage, experiments on dogs indicate that it is inferior to choloroform in single therapeutic dose of 0.2-0.3 m. p. k. in removing hookworms. In human medicine, it has been found necessary to give chenopodium in repeated doses, usually at hour intervals, in order to remove hookworms, and even under such conditions, several treatments are not infrequently necessary. To determine the method in which chenopodium could be successfully employed against the hookworm in the dog and to secure further data as to the anthelmintic action of this drug, the following experiments were performed:

Chenopodium in Doses Repeated Over a Number of Days.

Dog No. 153, weighing 16 kilos, was given 2 minims of chenopodium in 1 dram of castor oil daily for a total of 12 treatments in 13 days. The dog had distemper and died 2 days after the last treatment. No worms were passed. There were 7 whipworms postmortem. Treatment was therefore 0 percent effective against whipworms.

Dog No. 158, weighing 16 kilos, was given the same treatment daily for a total of 17 treatments in 20 days, and killed the day after the last treatment. The dog passed no worms and had 6 whipworms postmortem. Efficacy against whipworms, 0 percent.

Dog No. 152, weighing 12 kilos, was given the same treatment daily for a total of 18 treatments in 20 days, and killed 3 days after the last treatment. The dog passed 1 hookworm on the twelfth day after beginning treatment. It had 14 *Dipylidium* postmortem. Efficacy against hookworms, 100 per cent; against *Dipylidium,* 0 per cent.

Dog No. 154, weighing 15 kilos, was given the same treatment for a total of 18 treatments in 20 days, and killed 3 days after the last treatment. Through the 8 days after the first treatment, the dog passed a total of 8 hookworms and none thereafter. Postmortem it had 7 hookworms and 41 *Dipylidium.* Efficacy against hookworms, 53 per cent; against *Dipylidium,* 0 percent. It is

remarkable that over half of the hookworms should yield to 7 treatments and the remainder resist a total of 18 treatments, but this is in keeping with the difficulties and uncertainties of hookworm treatments as shown in numerous other experiments.

Dog No. 155, weighing 9.5 kilos, was given the same treatment for a total of 18 treatments in 20 days, and was killed 3 days later. In the first 3 days after the first treatment, the dog passed 2 hookworms and 1 was found in the large intestine postmortem. The dog had 2 other hookworms, 19 whipworms and 3 *Dipylidium* postmortem. Efficacy against hookworms, 60 percent; against whipworms and *Dipylidium*, 0 percent. This shows the same peculiarities as regards the resistance of individual hookworms to treatment.

Dog No. 156, weighing 9 kilos, was given the same treatment for a total of 18 treatments in 20 days, and killed 3 days later. The second day after the first treatment, the dog passed 1 ascarid. No worms were found postmortem. Efficacy against ascarids, 100 percent.

Dog No. 157, weighing 12 kilos, was given the same treatment for a total of 19 treatments in 23 days, and killed 1 day later. The ninth day after the first treatment, the dog passed 1 whipworm. The dog had 16 whipworms postmortem. Efficacy against whipworms, 6 percent.

Dog No. 159, weighing 14 kilos, was given the same treatment for a total of 19 treatments in 23 days, and killed 1 day later. The dog passed no worms and had 1 *Dipylidium* postmortem. Efficacy against *Dipylidium*, 0 percent. The preliminary fecal examination of this dog showed fluke eggs; no flukes were detected in the daily examination of the feces or postmortem. However, these flukes, a species of *Alaria (Hemistomum)*, are very small, not difficult to detect postmortem, but likely to be destroyed in feces and unrecognizable, and it is likely that the treatment removed them.

Dog No. 162, weighing 12.75 kilos, was given 5 minims of oil of chenopodium in the soft, or soluble elastic, capsule, followed immediately by 2 drams of castor oil, daily, for a total of 12 doses in 13 days, and was killed 5 days later. The second day after the first treatment, the dog passed 1 whipworm. It had 2 *Dipylidium* postmortem. Efficacy against whipworms, 100 percent; against *Dipylidium*, 0 percent.

Dog No. 163, weighing 15 kilos, was given the same treatment for a total of 12 treatments in 13 days, and was killed 5 days

later. The third day after the first treatment, the dog passed 1 hookworm, and 1 *Dipylidium* was found in the cecum postmortem. There were 97 other *Dipylidium* postmortem. Efficacy against hookworms, 100 percent; against *Dipylidium,* 1 percent.

Dog No. 164, weighing 15 kilos, was given the same treatment for a total of 12 treatments in 13 days, and was killed 5 days later. The second day after the first treatment, the dog passed 1 hookworm. It had 3 *Dipylidium* postmortem. Efficacy against hookworms, 100 percent; against *Dipylidium,* 0 percent.

Dog No. 165, weighing 14.5 kilos, was given the same treatment for a total of 12 treatments in 13 days, and was killed 5 days later. The fifth day after the first treatment, the dog passed 1 whipworm. It had 7 whipworms and 5 *Dipylidium* postmortem. Efficacy against whipworm, 13 percent; against *Dipylidium,* 0 percent.

Dog No. 166, weighing 12 kilos, was given the same treatment for a total of 12 treatments in 13 days, and was killed 2 days later. In the 5 days after the first treatment, the dog passed 29 ascarids, and in the 3 days after the first treatment, passed 24 *Dipylidium.* It had 1 whipworm postmortem. Efficacy against ascarids and *Dipylidium,* 100 percent; against whipworms, 0 percent.

Dog No. 167, weighing 14.5 kilos, was given 12 treatments in 13 days, and was killed 2 days later. In the 2 days after the first treatment, it passed 2 ascarids, and in the 11 days after the first treatment, it passed 54 whipworms. It had 12 whipworms and 1 *Dipylidium* postmortem. Efficacy against ascarids, 100 percent; against whipworms, 82 percent; against *Dipylidium,* 0 percent. Owing to an accident while collecting worms postmortem, some whipworms may have been lost, but the efficacy was about 75 percent or more.

Dog No. 168, weighing 11.5 kilos, was given the same treatment for a total of 12 treatments in 13 days, and was killed 2 days later. The day after the first treatment, the dog passed 2 ascarids, and the tenth day after the first treatment, it passed 3 whipworms. It had no worms postmortem. Efficacy against ascarids and whipworms, 100 percent.

Dog No. 169, weighing 12 kilos, was given the same treatment for a total of 12 treatments in 13 days, and was killed 2 days later. The day after the first treatment, the dog passed 2 ascarids. It had 1 *Dipylidium* postmortem. Efficacy against ascarids, 100 percent; against *Dipylidium,* 0 percent.

Dog No. 283, weighing 11.5 kilos, was given 5 minims of oil of chenopodium in soft (soluble elastic) gelatine capsules, followed by 15 mils of castor oil. Treatment was repeated on the third, fifth and seventh days thereafter. The dog was found dead 3 days after the last treatment. In the 8 days following the first treatment, the dog passed 3 hookworms. It had 11 hookworms postmortem. Efficacy against hookworms, 21 percent.

Dog No. 228, weighing 8 kilos, was given chenopodium at the rate of 0.05 m. p. k., with 30 mils of castor oil. The next day the dose was repeated and the dog was killed 6 days after the second treatment. On the day following the second treatment, the dog passed 5 hookworms, and in the 4 days following the first treatment, it passed 31 whipworms. It had 16 hookworms, 175 whipworms, and 2 *Dipylidium* postmortem. Efficacy against hookworms, 24 percent; against whipworms, 15 percent; against *Dipylidium,* 0 percent.

Chenopodium in Doses Repeated During One Day.

(Of the following 7 experiments, the 4 with dogs 293, 294, 299 and 309 have already been published in another paper. They are repeated here for the sake of completion.)

Dog No. 293, weighing 12 kilos, was given one 10-minim soft gelatine capsule of chenopodium every hour for a total of 3 doses, and the last dose was followed an hour later by 15 grams of Epsom salts in simple syrup. During the next 2 days the dog passed 4 hookworms, and was killed the fourth day after treatment. It had no worms postmortem. Efficacy against hookworms, 100 percent.

Dog No. 294, weighing 16 kilos, was given a 10-minim capsule of oil of chenopodium with ⅓ grain of cascarin; this was followed an hour later by a 10-minim capsule of chenopodium and another ⅓ grain of cascarin. In the next 4 days the dog passed 3 hookworms and 1 whipworm. It had 1 hookworm, 21 whipworms, and 6 *Taenia pisiformis* postmortem. Efficacy against hookworms, 75 percent; against whipworms, 5 percent; against tapeworms, 0 percent.

Dog No. 299, weighing 15 kilos, was given one 10-minim soft capsule of chenopodium every hour for a total of 3 doses, and was fed uncooked meat immediately after each dose to see if it afforded protection against the drug in the absence of purgation and also diminished the efficacy. The day after treatment, the dog passed 5 ascarids and 3 hookworms. It was killed the fourth

day. It had 5 hookworms. Efficacy against ascarids, 100 percent; against hookworms, 37.5 percent.

Dog No. 314, weighing 6 kilos, was given one 10-minim soft capsule of chenopodium at 8:30 A. M. and immediately fed some uncooked beef heart and bread. At 2:00 P. M. the dog was given a second 10-minim capsule and offered food, but refused it. At 4:35 it was given a third capsule and food. At 9:00 A. M. the next day the dog was given 30 mils of castor oil. This was an attempt to determine the effects in the administration of a capsule before each meal, advocated by some physicians in human cases of hookworm. The dog passed 2 ascarids the day after treatment, and was killed the fourth day. It had no worms postmortem. Efficacy against ascarids, 100 percent.

Dog No. 309, weighing 14 kilos, was given one 10-minim soft capsule every half hour for a total of 3 doses, the last dose being followed a half hour later by 30 mils of castor oil. At an undetermined interval after getting the castor oil, the dog broke out of its cage and ate some food. No worms were passed. The dog was killed the fifth day. It had 2 hookworms and 6 whipworms. Efficacy against hookworms and whipworms, 0 percent.

Dog No. 148, weighing 13 kilos, was given one 10-minim soft capsule of chenopodium every hour for a total of 3 doses, the last dose being followed immediately by 30 mils of castor oil. The dog passed no worms and was killed the fourth day. It had 6 whipworms. Efficacy against whipworms, 0 percent.

Dog No. 151, weighing 13 kilos, was given one 5-minim soft capsule of chenopodium every hour for a total of 3 doses, the last dose being followed immediately by 30 mils of castor oil. The dog passed 1 hookworm the day after treatment and 2 whipworms the third or fourth day after treatment. The animal was killed the fourth day. It had 1 whipworm postmortem. Efficacy against hookworms, 100 percent; against whipworms, 67 percent.

Where very small doses of chenopodium, 2 minims, were given daily for a total of 12 (1 case), 17 (1 case), 18 (4 cases) and 19 (2 cases) treatments, the efficacy against ascarids was, as usual, 100 percent; against hookworms, 100, 60, 53 and 0 percent; against whipworms, 6, 0, 0, 0, and 0 percent; against *Dipylidium,* 0 percent (5 times). These experiments confirm the idea that chenopodium is successful against ascarids almost always, that repeated doses increase its efficacy against hookworms, and that it should not be regarded as a tæniacide. They also bear out the writer's suggestion that santonin is the remedy

of choice for whipworms, as even these numerous treatments with small doses of chenopodium fail to remove these worms in most cases.

Where larger doses of chenopodium, 5 minims, are given daily for 12 doses, the drug shows the expected efficacy against ascarids, 100 percent (4 cases); an efficacy against hookworms of 100 percent (2 cases); against whipworms, 100 (2 cases), 75 to 82, 13 and 0 percent; and against tapeworms, 100, 1 and 0 (5 cases) percent. The efficacy against tapeworms is to be expected, the base of 100 percent efficacy against tapeworms is an accident, out of keeping with numerous failures on the part of this drug to remove any tapeworms whatever; the whipworm findings indicate that repeated doses of 5 minims daily are much more effective than 2 minims daily; the findings for hookworm are based in both cases on a single hookworm and so are inconclusive.

A test of this same 5-minim dose every other day for 4 days showed 21 percent efficacy against hookworms.

A test of half the therapeutic dose (0.1 m. p. k.), or 0.05 m. p. k., given on 2 successive days, showed 24 percent efficacy against hookworms, 15 percent against whipworms, and 0 percent against *Dipylidium.*

In the repeated doses given in 1 day, three 10-minim doses at hour intervals, followed by Epsom salts, were 100 percent effective against hookworm, and 67 and 0 percent effective against whipworms; the same dose, given with cascarin, was 75 percent effective against hookworms, 5 percent effective against whipworms, and 0 percent effective against tapeworms; the same dose with meat, but without purgation, was 100 percent effective against ascarids and 37.5 percent effective against hookworms, the same dose, given 3 times during the day with food, was 100 percent effective against ascarids; the same dose, given every half hour and followed a half hour later by castor oil, was 0 percent effective against hookworms.

The foregoing suggests that chenopodium in repeated doses of 5 minims daily for 12 doses is rather efficacious against ascarids, whipworms, and, probably, hookworms. But such prolonged treatment is objectionable from the standpoint of the practitioner. The use of three 10-minim doses at hour intervals, followed by a purgative an hour later, gives promise of success in treating dogs as in treating man for hookworms, but, even as in that case, repeated treatments will not infrequently be

necessary. This subject demands more data. Prolonged experience to date only enables us to formulate the following statements with regard to oil of chenopodium:

Oil of chenopodium has no equal as a drug for the removal of ascarids, as it will in the big majority of cases remove 100 percent of the worms present in the dog, and is apparently about as effective, under proper conditions of administration, against ascarids of man and swine. It is apparently as effective as anything against ascarids in the horse and will probably give satisfactory results when it has been sufficiently studied to ascertain the proper dose and mode of administration.

Chenopodium does not have, in our experience, as much value for removing hookworms in single therapeutic dose as does chloroform, but such experimental evidence as we have, together with the clinical evidence of thousands of human cases treated with chenopodium, indicates that in repeated doses, either at hour intervals or on consecutive days, it should prove reasonably satisfactory against hookworms in dogs.

No drug can be depended on to remove whipworms when given in single dose, as the writer has stated elsewhere. Repeated doses of oil of chenopodium, 5 minims daily for 12 days, for instance, seem to give rather good results and warrant further investigations along this line. But the fact that santonin is not a gastro-intestinal irritant gives it the choice for use against whipworms, so far as we are aware at present. It can be given in doses of a half-grain or a grain daily, with equal amounts of calomel, and seems entirely safe when so given, so far as our experiments show.

Chenopodium will occasionally remove tapeworms, but the numerous failures to remove any in a long series of experiments show positively that it cannot be regarded as a suitable anthelmintic for the removal of tapeworms, so far as dog tapeworms are concerned, and so far as findings in regard to them can be applied to other tapeworms and hosts.

The national prohibition amendment will do one good thing, anyway, in the opinion of a well-known horseman of Salina, Kansas. It will give the horses enough to eat. "Closing the breweries has practically killed the demand for barley," said Mr. Price. "Barley makes excellent feed for horses, and with corn, bran and chops at their present high prices, this is the solution of a problem."

CLINICAL AND CASE REPORTS.

SARCO-CHONDRO-OSTEOMATA OF A HEN.

B. F. Kaupp,
From the Laboratory of Pathology of the
North Carolina Experiment Station.

Sarcomata develop either in previously normal tissue belonging to the connective-tissue group—as, subcutaneous tissue, or connective tissue of glands, etc. — or in some preëxisting connective-tissue tumor, as a fibroma, chondroma, etc. The transformation of the parent tissue into tumor tissue takes place through the growth and multiplication of the existing cells. The division of the cells takes place chiefly by mitosis.

FIGURE 1.
Sarco-Chondro-Osteomata of the Tibial Region of a S. C. Rhode Island Red Hen.

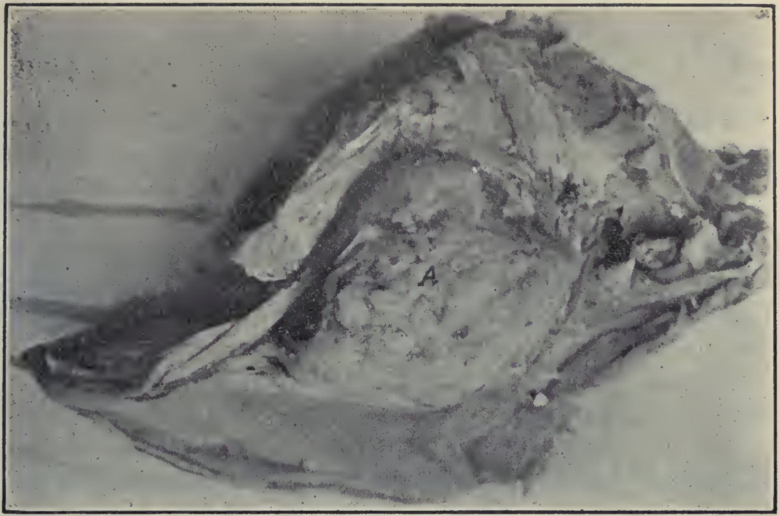

FIGURE 2.
Sarco-Chondro-Osteomata of the Thoracic Wall of a Hen. *A*, the Tumor.

Chondromata develop chiefly in those places where cartilage is found normally—that is, in the osseous system or in the cartilage of the respiratory tract; but they also occur in tissues which normally possess no cartilage—for example, in the salivary glands, and in the testicles and more rarely in other organs.* Like sarcomas, chondromas may be associated with other tumor tissue as sarcoma, myxoma, fibroma, etc. The cartilage may become ossified, forming osteomatous tissue.

Osteomata is applied to tumors consisting of osseous tissue. Such growths arise chiefly from the bones of the skeleton, but may develop elsewhere. The abundant production of bone in a chondroma leads to the formation of an osteochondroma.

Sarcomata are particularly liable to secondary changes. Areas in the tumor may show a decided disposition to complete the developmental tendency of connective tissue. As a result of such processes true bone formation may occur—osteosarcoma; or cartilage may be produced—chondrosarcoma.†

Case Report.

The case here described furnishes a tumor of multiplicity of tissues of a conjunctive nature. Similar tumors have been described in the bitch by Petit of France.

* Ziegler, Ernst. General Pathology. Wm. Wood & Co.; New York, 1908.
† Manual of Pathology, Coplin, W. M., P. Blakiston's Sons Co., Philadelphia, Pa., 1908.

History.—A Single Comb Rhode Island Red hen was brought to the laboratory with the report that an enlargement had gradually been developing on the tibia just above the hock (Fig. 1). The bird was thin in flesh. There were also other tumors observed on the sides of the thoracic walls. The bird seemed to suffer no inconvenience, having a good appetite, and appeared happily disposed. The bird was killed by gas in the death chamber for autopsy purposes.

Autopsy findings.—There is observed an irregular-shaped tumor on the left thoracic wall measuring 2 x 2 x 1.5 cm. There is also an irregular-shaped tumor on the right thoracic wall measuring 7 x 6 x 2 cm. This latter tumor is shown in Fig. 2A. These two tumors were attached to the ribs. A third hard tumor, irregular in shape, was observed on the leg just above the hock (Fig. 1). This tumor measured 7 x 10 x 11 cm. The tumor had no capsule; on the other hand, presented rather a raw surface. It sprang from the subcutaneous connective tissue. Both macroscopic and miscroscopic examination was made of these tumors. A sagittal section is shown of the tumor from the leg in Fig. 3. At *a* will be seen an osseous ulcer containing true bone tissue; at *b* is seen fibro-cartilage of this bone; at *c* is sarcomatous tissue;

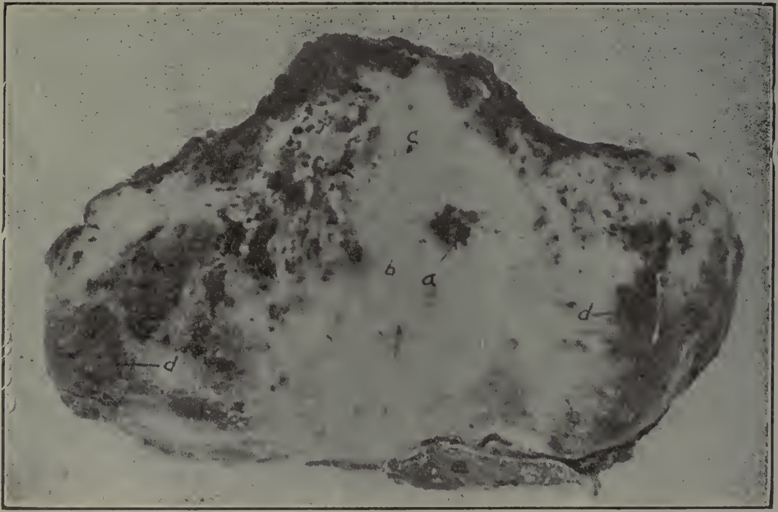

FIGURE 3.
Sagittal Section of the Sarco-Chondro-Osteomata Shown in Figure 1. *A*, Osseous Ulcer; *B*, Fibro-Cartilage; *C*, Sarcomatous; D, Hemorrhagic Spots, Frequent in Sarcomas; *E*, Skin and Subcutaneous Tissue from Which Tumor Sprang.

at *d* is seen hemorrhagic spots, frequent in sarcomas; at *e* is the skin and subcutaneous tissue from which the tumor springs. The sarcomatous elements are of the large spindle-celled variety.

FAILURE OF BLACKLEG CULTURE FILTRATE TO CONFER LASTING IMMUNITY IN ANIMALS VACCINATED UNDER SIX MONTHS OF AGE.

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In January, 1918, two yearling heifer calves died of blackleg on the campus hill pasture occupied by the University Certified Dairy. This was the first appearance of the disease on this land, despite the fact that it had been used constantly for cattle during the last fourteen years and no preventive vaccination given.

Cultures were made from the tissues of the second animal and *B. Chauvei* isolated by Dr. J. Traum, in the Veterinary Science Laboratory. The remaining animals, numbering 23 head, were vaccinated on January 23, 1918, with blackleg culture filtrate, including one calf, No. 2062, which was born December 22, 1917, and was one month old at time of vaccination. On May 28, 1918, calf No. 2062 was found on the pasture with a large crepitating swelling on the left shoulder. One hundred and fifty mils of blackleg serum were immediately given subcutaneously, a portion at several points around the circumference of the swelling and fifty mils intravenously. The following day 100 mils additional were given intravenously. The animal recovered, but months elapsed before the swelling had entirely disappeared and at present writing, one year after the attack, the animal is unable to perfectly use its left shoulder. It, therefore, had lost its immunity and became naturally infected with the disease four months and five days after being vaccinated.

On May 29, 1918, twenty animals were vaccinated, ten receiving culture filtrate and ten tissue filtrate (aggressin). All of these animals had received a previous dose of culture filtrate on January 23. It was decided not to again vaccinate these animals unless more deaths occurred, and at the same time new calves weaned and turned on the range were to be given but one vaccination. No cases of blackleg have occurred in the twenty head, sixteen of which are still on the range, three having been killed and one died from an injury.

The latter part of December, 1918, three weaned calves were vaccinated for the first time with culture filtrate and turned on the pasture. One of these calves, No. 2064, was born on September 7, and was therefore over three months old when vaccinated. On April 18, 1919, this animal was found dead and a positive diagnosis of blackleg made and *B. Chauvei* isolated. This animal, therefore, had lost its immunity and succumbed to a natural infection with blackleg four months after being vaccinated.

In many parts of California it is necessary to vaccinate calves well under six months of age, to prevent losses. When such vaccination is applied to young animals it should be repeated twice yearly, the same as though the old muscle vaccine were being used.

TENDONITIS AND PERIOSTITIS RESULTING FROM INJURY BY A CELLULOID SPIROLET LEG BAND.

B. F. Kaupp,
From the Laboratory of Pathology of the
North Carolina Experiment Station.

History.

A one-year-old Single Comb Rhode Island Red cock from pen 26 trap-nested Rhode Island Reds on the Experiment Station poultry plant. The bird had always been in good health. He was marked with a celluloid leg band for purpose of identification. The band had worked its way to near the hock and had become, by pressure, partly imbedded into the skin of the region. As a result of this injury tendonitis and later productive inflammation with periostitis developed.

Symptoms.

The bird was first noted to be lame. Upon examination the spirolet band was found injuring the leg and was removed. The bird continued to become worse and was finally removed from the flock and placed in the hospital.

The posterior portion of the leg in the metatarsal region was swollen and appeared to contain an abscess. The part was lanced and a quantity of cheesy pus removed. This treatment was repeated at intervals of about ten days for about a month. After curetting, each time, the wound was treated with iodine. Finally the abscess condition appeared to have disappeared but there

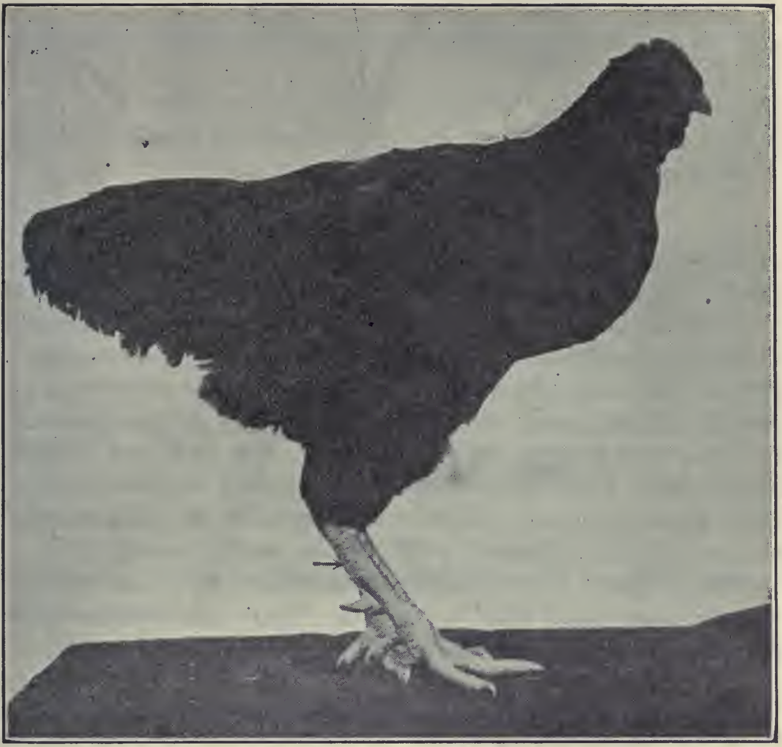


FIGURE 1.
Early stages of tendonitis caused by injury in a S. C. Rhode Island Red cock.

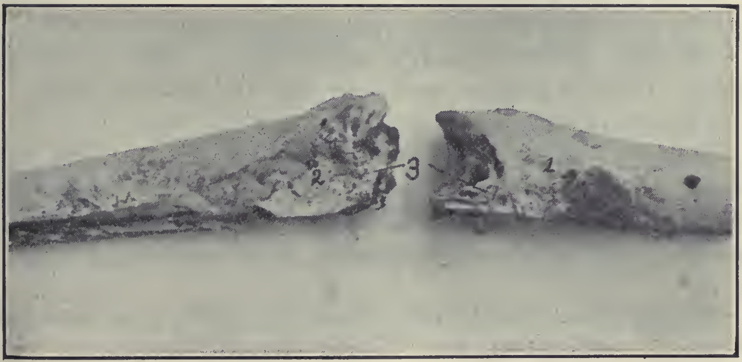


FIGURE 2.
Periostitis with exostaosis of distal end of tibia and proximal end of metatarsus. 1, tibia; 2, metatarsus; 3, bony deposits.

was a productive inflammation involving the tendons of the flexor region and the other soft structure, as shown in Fig. 1.

Repeated painting of these tendons with iodine did not in any way control the inflammation, and finally the entire hock joint became affected. Finally, after about four months, during which time the bird became extremely emaciated, the patient was destroyed for study purposes. During these weeks the bird showed evidence of considerable pain.

Autopsy.

A post-mortem examination showed the hock joint to be greatly enlarged and hard to the touch, with the exception of the outer upper portion of the enlargement, which showed a fluctuating spot suggestive of an abscess. This surface was sterilized with alcohol and with a sterile knife was lanced and found to contain a cheesy pus. After inoculating some culture medium, for study of a possible organism, a smear was made and stained with aqueous fuchsin for study. This material was found to be made up of polymorphonuclear cells with a few mononuclears and some erythrocytes with a small coccus or diplococcus.

The specimen was boiled and the soft structures removed, so that the bony parts could be studied. There was evidence of a periostitis with abundant exostosis formation, as shown in Fig. 2.

Bacteriological Study.

Character of the organism.—The organism, as it appears in prepared specimens, is a small coccus about 0.7 micron in diameter and appears single, in pairs, or in groups.

There are no spores, flagella, or capsules.

It grows rather slow, the optimum temperature being 37°C.

Staining reactions, readily with ordinary aniline dyes as fuchsin, Löffler's alkaline methylene blue and gentian violet.

Reaction to gram stain, positive.

Cultural features.—Agar stroke, growth slow at first, was abundant by the end of 48 hours. Form of growth, echinulate. Elevation, raised. Luster, glistening. Topography, surface smooth. Optical characters, opaque. Chromogenesis, dirty yellow.

Potato.—Growth, moderate. Form of growth, little tendency to spread. Elevation, flat. Luster, dull. Topography, contoured.

Chromogenesis.—Light orange-yellow. Diastatic action, strong.

Agar Stab.—Growth, moderate. Best on top. Line of puncture, scant and echinulate.

Gelatin Stab.—Growth slow with liquefaction after ten days.

Nutrient Broth.—Surface growth, small pellicles at end of 48 hours. Clouding, diffuse cloudiness, later medium becomes clear with a slightly yellowish sediment.

Milk.—Coagulates milk in 9 days at 37°C., with very slow digestion of the curd. The coagulum is very firm.

Agar Colonies.—Colonies at the end of 24 hours vary in diameter up to 1 mm. The edges are smooth and the color is orange-yellow.

Growth in Broth Over Chloroform.—No growth occurs.

Growth in Glycerol Broth.—The organism grew abundantly in the open arm without gas formation. There was formation of 5 per cent acid.

Reduction of Nitrates.—At the end of 14 days there was a marked reduction of nitrates.

Formation of Indol.—Negative.

Growth Under Oil.—Slow growth, showing it to be a facultative anærobe.

Thermal Death Point.—Time of exposure in water bath, 10 minutes.

Temperature (C)	24 hours	48 hours	72 hours	96 hours	7 days
Control	+	+	+	+	+
46	+	+	+	+	+
50	+	+	+	+	+
54	+	+	+	+	+
58	—	—	+	+	+
62	—	—	—	—	—
64	—	—	—	—	—

The exposure to 58°C. arrests growth and 62°C. kills the organism.

Below is given the results of the action of this organism on six different sugars. All fermentation tubes contained 1% of the sugar. Titration made at the end of 14 days.

Sugar	Control	Tube 1	Tube 2	Average
Maltose	0.5	3.0	3.5	3.25
Dextrose	0.5	4.5	4.5	4.50
Saccharose	0.5	3.0	3.5	3.25
Mannite	0.5	5.5	5.0	5.25
Lactose	0.5	4.5	4.5	4.50
Raffinose	0.5	0.5	0.5	0.50

There was no change in the raffinose. There was strong acid formation in the maltose, dextrose, saccharose, mannite and lactose.

This organism corresponds to type A of Staphylococcus aureus as indicated by McFarland.[1]

This organism corresponds very close to M1 as described by Jones,[2] though an absolute comparison cannot be made owing to the fact that Jones titrated at five days and we titrated at 14 days. However, we have, as in his M1, the organism-forming clumps, orange to orange-yellow (his was orange), milk firmly coagulated, fermentation with acid production in dextrose, lactose, saccharose and maltose, with no acid formation in raffinose. We did not try our organism in silicin or inulin. Our organism belongs to the staphylococcus group and not to the galactococcus group.

In terms of the numerical system of recording the salient characters of an organism (group number), as suggested by the Society of American Bacteriologists, we have as a total 221.2223612.

Pathogenicity.

In the early part of this paper it was shown that this organism was isolated, in pure culture, from the shank of a Single Comb Rhode Island Red cock. The following inoculations were made upon other birds.

[1] Joseph McFarland, Pathogenic Bacteria and Protozoa, p. 342, 1912.

[2] F. S. Jones, Studies in Bovine Mastitis, III. Infection of the Udder with Micrococci and Other Microörganisms. Jr. Exp. Med., Dec. 1, 1918, Vol. xxviii, No. 6, pp. 721-733.

Case No. 1.—A Single Comb White Leghorn hen, leg band No. A13, was inoculated with 3 c.c. of an emulsion in bouillon into the left shank, forcing the liquid along the flexor tendons and around the hock. The bird at the end of 24 hours showed great depression, lameness and a partial loss of appetite. Considerable local reaction resulted, the part being hot and sensitive to touch. The bird was unable to use its leg, gradually became emaciated, finally a total loss of appetite with fatal diarrhœa, the bowel discharges being of a greenish-yellow color and fluid in consistency. The bird died on the 24th, or eleven days after inoculation.

Upon opening the abdominal and thoracic cavities the organs appeared normal, with the exception of the kidneys, which appeared a grayish color, indicating a possible cloudy swelling. Cultures were made from the kidneys, liver and heart blood. The swelling of the shank at the point of inoculation had subsided. All inoculated tubes showed pure cultures of the Staphylococcus pyogenes aureus inoculated. The organism, in this case inoculated subcutaneously into the shank, produced a local reaction which subsided in a few days without suppuration, and a fatal septicemia, which caused the death of the bird in eleven days, giving the above clinical picture.

The liver and kidneys, upon microscopic examination, showed cloudy swelling.

Case No. 2.—A Single Comb White Leghorn hen, leg band No. 42, was inoculated with 4 c.c. of an emulsion in bouillon subcutaneously and in the left shank. The point of inoculation, at the end of 24 hours, was hot and painful to the touch, indicating a rather violent local reaction. There was a gradual loss of appetite, with resultant loss of flesh. Diarrhœa developed, but subsided in about ten days. This bird was inoculated on January 13, 1919. On March 6, 1919, she was observed and measurements taken. Her original weight was 3.1 pounds; she now weighed 2.5 pounds and appeared cheerful. The left hock was enlarged with apparent exostosis and the leg could not be extended, it apparently being in constant flexion, perhaps due to the fact that the bird, unable to use the leg, held it constantly in a flexed position. The right hock measured 5.5 c.m. in circumference and the left, or inoculated hock, 7 cm. in circumference. The inoculation was not made directly into the hock but midway of the metatarsus and by pressure forced up into the hock along the flexor tendons. The bird now has a good appetite.

The bird was killed in the death chamber and shank cooked to determine the extent of exostosis that had taken place. It was evidenced that the bird had gained considerable of her weight she had lost as a result of the severe symptoms following the injection, in which there appeared a possible septicemia but from which she had now entirely recovered with the exception of the hock lesion.

After cooking out the tibia and metatarsus an examination of the bones revealed an ulceration, or destruction of the articular cartilage of the upper distal end of the metatarsus, and a beginning exostosis of the distal end of the tibia outside the ulcerated portion. This organism has, then, reproduced the condition found in the cock from which it was first isolated.

Case No. 3.—A Single Comb Rhode Island Red cockerel, eight months old, was inoculated in the right shank. The method of inoculation was as follows: A sterile thread was pulled through between the flexor tendons by aid of a curved needle. As the string was pulled through a loopful of the culture from an agar slant was placed upon it so that inoculation was along the course of the string, thus making a foreign body by clipping the string close on each side of the leg. The inoculation was made on January 29, 1919, and on February 2, 1919, there was noted an acute suppurative process following the usual symptom of heat, swelling and painfulness to the touch. Like the two preceding inoculations, the bird was not able to bear any weight on the inoculated leg and, in fact, held the leg suspended in the air. This was followed by a gradual loss of appetite with gradual emaciation, and the bird died at 2 p. m., February 12, 1919, in a very emaciated condition. Like the two previous cases, the bird developed a diarrhœa, the bowel discharges being of a yellowish-green color.

Autopsy.

After the skin in the region of the point of inoculation of the shank had been sterilized with alcohol an incision was made into the point of inoculation. There was present a small amount of cheesy pus along the thread, from which a pure culture of the Staphylococcus pyogenes aureus was obtained. The kidneys appeared a pale gray, indicating a cloudy swelling. The ureters were blocked, being distended with a pasty material in the anterior portion, and a watery material in the posterior part. Sectioned surfaces of the kidneys showed both active and passive

congestion. Pure culture of the organism was recovered from the kidneys and also from the liver. The liver was dark in color and apparently congested, as noted from the sectioned surface.

Microscopic Study.

Liver, both active and passive congestion. Cloudy swelling is present. In some sections the nuclei stain faintly or not at all, and the cytoplasm in these cells stains very faintly. These areas are nearing a state of focal necrosis. In these areas there are noted some cells in a state of mitosis.

Kidneys, both active and passive congestion is present. In the convoluted tubules to some extent, and to a greater extent in the collecting tubules, there are noted both polymorphonuclear and mononuclear leucocytes. Cloudy swelling of the cells of the tubules is present and in some zones the cells are swollen and their bases have left the periphery and moved toward the center, partially, and in some cases completely, clouding the lumen. In some areas the cytoplasm and nuclei stain very faintly and are apparently nearing a state of focal necrosis.

Case No. 4.—Rabbit inoculation. To determine if this organism will produce a suppurative inflammation in the rabbit there was given subcutaneously to a half-grown hare 2 c.c. of a bouillon culture. At the end of 24 hours there was slight induration at the point of inoculation, with some heat and tenderness. By the end of the third day all indications of a disturbance at the point of inoculation had subsided. This is only one test, but in this case the organism failed to produce abscess.

Summary.

There is here presented a case of infection of the fowl with the Staphylococcus pyogenes aureus. The organism is isolated in pure culture from an abscess of the hock.

Infection of the hock with Staphylococcus pyogenes aureus in this case caused abscess, with exostosis and immobility of the joint.

Inoculations of the above organism into other fowls produced in one a similar condition of abscess and exostosis. In others it caused a fatal septicemia, the organism being reisolated from the kidneys, liver and heart blood.

In one inoculation of the hare subcutaneously by the above organism no abscess or septicemia was produced.

PSEUDO-LEUKAEMIA IN A DOG.

H. J. Milks,
Department of Small Animal Diseases, and
S. A. Goldberg,
Department of Pathology,
New York State Veterinary College, at Cornell University, Ithaca, N. Y.

A three year old grey fox hound male. The owner stated that the animal progressively lost weight for about two months. The clinical examination showed the animal greatly emaciated, the ribs and hip bones standing out prominently. He showed slight dullness and depression. All the external lymph glands were enlarged, firm and prominent. The abdomen was slightly tucked up, and palpation showed several large hard masses, probably enlarged lymph glands. The temperature for five days varied from 102.3°F. to 103.4°F.; the pulse varied from 108 to 120; the respiration varied from 24 to 50. Blood examination showed Hæmoglobin 96%, Erythrocytes 3,146,000, Leucocytes 7200. No differential count was made. Presumptive diagnosis, pseudoleukæmia or Hodgkin's disease. The animal was destroyed by chloroform.

Autopsy protocol.—The external examination showed the animal to be greatly emaciated. All the superficial lymph glands were greatly enlarged. The mucous membranes and conjunctivæ appeared normal.

Internal examination showed the animal to be in very poor condition. There was very little subcutaneous and subperitoneal fat. The peritoneum, as well as the arrangement of the organs, was normal.

The spleen was of a bright red color throughout. It was greatly enlarged, being 29 cm. long, 14 cm. wide at its widest point, gradually tapering down to 6 cm. at its opposite end, and 3 cm. thick at the thickest point. It weighed 316 gms. On section it bulged. There were rounded whitish nodules, .5 mm. to 2 mm. in diameter, uniformly distributed throughout the splenic pulp. Microscopically, the splenic pulp was nearly entirely gone. There was an infiltration of round cells resembling lymphocytes throughout. There was also considerable hyperæmia. The trabeculæ were also greatly infiltrated by round cells.

The kidneys were slightly lighter than normal. On section they bulged slightly, the cortices were somewhat lighter than normal. There was a red zone of hyperæmia between the cortices and medullæ. The medullæ were normal. Microscopically, the

FIGURE 1.

glomerular arterioles were markedly congested. Most of the Bowman's capsules were filled with coagulum. The convoluted tubules showed marked cloudy swelling. There were few casts in the straight tubules.

The liver was slightly enlarged and lighter in color than normal. It appeared normal in consistency. The lobules were apparent. The centers of the lobules were red, while at the periphery they appeared yellowish white. On section blood oozed out. The liver tissue appeared somewhat hazy. It bulged very slightly on section. Weight of the organ was 950 gms. Microscopically, all the periportal spaces and the interlobular connective tissue were infiltrated by small round cells resembling lymphocytes. There was less infiltration around the central veins. The liver cells showed granular and fatty degeneration and there was some congestion of the sinusoids.

There was little greyish semiliquid feces in the intestines. The stomach was nearly empty. The mucosa of the intestines was uniformly thickened, of a greyish color and thrown into folds. The other coats were also somewhat thickened. The Peyer's patches were apparently not enlarged. Microscopically, the intestinal mucosa showed marked mucoid degeneration. Practically the entire epithelium was replaced by goblet cells. There was a marked increase in the connective tissue of the submucosa. The other coats were normal.

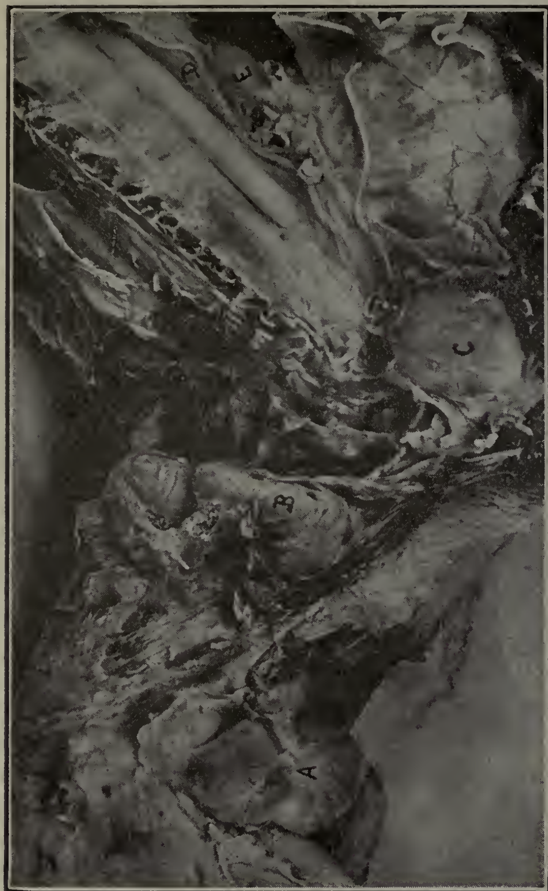


FIGURE 2.

The prostate gland was somewhat enlarged, otherwise the genital organs appeared normal. Microscopically, the prostate gland showed hypertrophy and degeneration.

The bone marrow was lighter in color than normal, otherwise it was apparently unchanged.

In the brain the meninges were congested, the lateral ventricles were apparently somewhat distended. The floor of the lateral ventricles and the choroid plexuses were somewhat congested. Microscopically, the meninges showed some congestion, otherwise the brain appeared normal.

The pleuræ were apparently normal. The lungs showed some anthracosis, otherwise they appeared normal.

FIGURE 3.

In the heart the myocardium was lighter in color than normal. The valves, endo, and pericardium were normal. The coronary vessels were congested. Microscopically, the myocardium showed marked cloudy swelling, the epicardium showed some congestion. There was no lymphocytic infiltration in any part of the heart muscle.

All the lymph glands were greatly enlarged, some were slightly congested, but most of them were of a greyish or yellowish grey color. On section they bulged and appeared homogeneous. The larger lymph glands showed some softening in the center. The lymph vessels draining into the lymph glands were prominent, as were also the lymph ducts. Microscopically, the structure of the lymph glands was entirely changed. The lymph

nodules, as well as the sinuses, were obliterated. They presented a uniform mass of lymphocytes, some of which showed degeneration. The trabeculæ and the capsules were infiltrated by lymphocytes. The following is a description of the lymph glands in detail, giving the dimensions in centimeters and the weights of the groups in grams:

	Number of Glands Found	Dimensions in Centimeters				Wt. of Group in gms.
		First	Second	Third	Fourth	
L. Submaxillary.......	3	6x3x2	4x4x2.5	3x2x1	....	45.5
R. "	3	6.2x4.5x2.3	3.4x3x3.2	3x3.2x1.3	....	48.5
L. Subparotid.........	2	2x1.7x.9	.9x.8x.5	....	....	5.5
R. "	2	2x1.8x1.2	2.3x1x.8	....	....	8.0
L. Retropharyngeal....	2	8.5x4.5x2.5	3.2x1.9x.8	....	....	55.0
R. "	1 Constricted	Body	Ant. Const.	Post. Const.		
	at each end	6x4x2.5	2x2x1	4x4x3.2	....	49.0
L. Prescapular........	2	7.2x6.4x3	7x4.5x2.5	....	....	107.0
R. "	2	7x5.5x4	6.5x4.7x3	....	....	112.5
L. Subscapular........	1	5.5x5x2	....	....	....	33.5
R. "	1	3x2x1	....	....	....	15.0
L. Bronchial..........	1	7x2.5x2	....	....	....	....
R. "	2	See below	2.8x1x1	....	....	19.0
L. Renal.............	2	3.8x1.8x1.2	1.9x1x.6	....	....	....
R. "	3	3.1x1.8x1.8	2.5x1.2x.8	1.3x.5x.5	....	18.0
L. Int. Inguinal.......	2	1.9x1.6x1	1.8x1.5x1	....	....	....
R. "	2	2.8x2x1.4	.7x.7x.7	....	....	14.5
L. Sacral.............	1	2.8x1.8x1.2	....	....	....	....
R. "	3	2.5x1.5x1.4	2.5x1.5x1	2.5x1.4x.9	....	16.0
L. Ischiatic...........	1	1.6x1.3x.7	....	....	....	....
R. "	1	2.3x2x1.2	....	....	....	7.5
L. Ext. Inguinal.......	1	7x4x2.3	....	....	....	....
R. "	1	8x5x3.5	....	....	....	100.0
L. Popliteal	1	5x3.5x2.5	....	....	....	....
R. "	1	5x3.5x2.5	....	....	....	56.0
Sternal...............	6	3.2x2.5x1.6	4x2.5x1.5	3.3x2.3x1.2	2.5x1.7x1.3	....
		5th	6th			
		1.6x1.4x1.1	1.7x1.3x.9	....	....	30.0
		Smallest	Largest			
Mediastinal...........	11	.8x.6x.4	2.5x1.5x1	....	....	25.0
Gastric...............	2	4.5x3x2.5	1.2x1.2x1	....	....	....
Pancreatic............	4	7.1x3.7x3.7	3.5x2.5x2.5	1.9x1.3x1.5	1.5x1.2x.9	82.5
Hepatic..............	3	12x8.5x5	5x5x3.5	1x1x1	....	267.0
Rectal...............	3	5x3.2x2.5	3.9x2.7x2	2.9x2.5x2	....	35.5
		Largest	Smallest			
Lumbar and Sublumbar	12	8x4.5x3.5	2x1.2x.8	....	....	129.0

A few of the lymph glands are worthy of special mention. The mesenteric gland was in the form of a coiled mass surrounding the cæcum and the ileo-cæcal valve. The coil was 15 cm. in diameter and 9 cm. thick. It weighed 637 gms.

There was a group of lymph glands in the region of the vena cava and the abdominal aorta on the abdominal surface of the

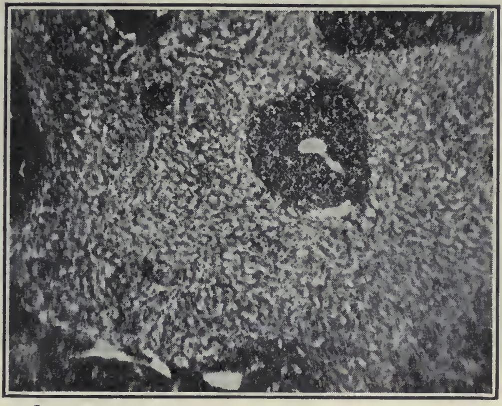


FIGURE 4.

diaphragm. The largest was at the aorta, 5x2x1.5 cm. The others, six in number, were around the vena cava. The largest was 3.2x1.2x.6 cm.; the smallest 9 mm. long and 5 mm. in diameter. The weight of the group was 20 gms.

One of the right bronchial lymph glands was constricted in the center and this constriction embraced the right bronchus. Each of the ends measured 2x1.8x1.3 cm. The constricted part measured 2.3x.9x.6 cm.

There was one triangular-shaped irregularly lobulated lymph gland at the posterior bifurcation of the trachea fitted in between the two large bronchi and closely adherent to each bronchus. One side measured 4x3.2x2 cm.; the other side 5x3.2x1.7 cm. It weighed 20 gms.

The weight of all the lymph glands placed on the scale was 1911.5 gms., the computed weight is 1847.5 gms.

The thyroid glands were considerably enlarged. They were held together by an isthmus so that they appeared as one horse-shoe-shaped thyroid, somewhat similar to that of man. The right lobe was 4.6x2.3x.6 cm. The left lobe was 5.7x2.3x.9 cm. The isthmus was 3.3x1.7x.2 cm. What appeared to be the para-thyroids were embedded at about the middle of the external surface of each lobe. Each measured 8x4x3 mm. The total weight of the thyroids and parathyroids was 18 gms. Microscopically, the thyroid glands have lost their normal structure. There was no colloid in the follicles. The number of cells in the follicles was increased. Most of them were broken away from their base-

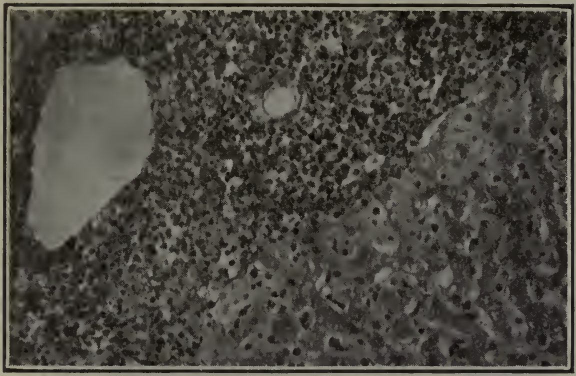


FIGURE 5.

ment membranes and were markedly degenerated. There was slight active hyperæmia.

Bacteriological Examination.—Media inoculated from the liver gave a growth of micrococcus pyogenes aureus; from the spleen no growth resulted; from the brain a growth of micrococcus pyogenes citreus was obtained.

Diagnosis.—*Immediate cause of death,* chloroform poisoning. *Fatal illness,* pseudo-leukæmia. *Old lesions,* hypertrophy of prostate; chronic catarrhal enteritis, colitis, etc.; parenchymatous strumitis. *Parasites,* none found.

Remarks.—The acute parenchymatous nephritis, the degeneration of the liver and myocardium were either secondary to the pseudo-leukæmia or due to the chloroform poisoning, perhaps both.

According to the history, the duration of this condition was apparently two months. It is possible, however, that the condition was unnoticed for a considerably longer period. In man the condition is sometimes present for years before the patient thinks of consulting a physician.

The weight of the animal was 21 kilos. The spleen and the lymph glands were approximately 11 per cent of the body weight of the animal.

It is doubtful whether the condition of the parathyroids and thyroids had any relation to the pseudo-leukæmia.

This disease is to be differentiated from lymphosarcomatosis. The latter is more malignant and rarely are all the lymph glands affected. In lymphosarcoma the groups of glands are usually in one indistinguishable mass, and the lymph glands are closely

adherent to the surrounding tissues. They are also more or less nodular. In this case all the lymph glands were affected, they were not nodular, they were separate from each other, and not adherent to the surrounding structures. Leukæmia is ruled out on account of the normal blood picture. Tuberculosis and chronic productive lymphadenitis were excluded on microscopic examination. This leaves the only possibility, that of pseudo-leukæmia.

DESCRIPTION OF PLATES.

FIG. 1. The living animal showing emaciation and enlarged superficial lymph glands.

FIG. 2. Proximal portion of animal exposed. (The lungs were removed.)
- A. Submaxillary lymph gland.
- B. Prescapular lymph gland.
- C. Subscapular lymph gland.
- D. Lymph duct.
- E. Mediastinal lymph glands.

FIG. 3. Abdominal portion of animal exposed. (The stomach and most of the intestines were removed.)
- F. Spleen greatly enlarged.
- G. Liver.
- H. Pancreatic lymph gland.
- I. Mesenteric lymph gland.
- J. Pancreas.

FIG. 4. Section of liver. x55. Showing an increased number of lymphocytes in the periportal spaces.

FIG. 5. Same as Fig. 4. x180. Showing a bile duct, a vein, and an arteriole completely surrounded by lymphocytes. Also fatty degeneration of the cords of liver cells.

Major Horace B. F. Jervis has returned from service overseas and is again located at Houlton, Maine.

After having served with the 88th Division for a year in France, Lieutenant Roy H. Tesdell has returned to his home at Huxley, Iowa.

Lieutenant J. Earle Gilfillan has received his discharge from the Army and has returned to practice in Wilmington, Del. Lieutenant Gilfillan has been located at Camp Devens, Mass., for the past several months.

SUBCUTANEOUS TUBERCULIN RETEST OF CATTLE.

D. H. JONES,
Professor of Bacteriology,
Ontario Agricultural College, Guelph, Ontario.

We have recently had an opportunity of testing Gilliland's theory that "If animals that had given a suspicious reaction were to receive five to ten days later a much larger dose they would give a strong reaction if tuberculous, and a negative result if non-tuberculous."

Reports verifying this theory were made by C. J. Marshall and H. W. Turner of Pennsylvania at the 54th annual meeting of the American Veterinary Medical Association, Kansas City, Missouri, August, 1917, as recorded in the Journal of the American Veterinary Medical Association, Vol. 52, December, 1917.

On March 12 the temperature readings of a herd of purebred dairy cattle that had been subjected to the subcutaneous tuberculin test were submitted to us for consideration. The herd was one which had been systematically tested every six months for eight years and reactors either slaughtered or, when in apparently good condition, removed to a stable in which were kept only reactors. The calves produced by these animals were removed as soon as born and fed milk from the healthy stock, the Bang system being followed for the eradication of the disease from the herd. Most of the animals were calved on the premises. Any new stock purchased was not allowed to mix with the herd until tuberculin tested and shown to be negative to the test.

Notwithstanding these precautions, one or more fresh reactors were occasionally found at the half-yearly tests. The causes of these new infections were eventually considered to be the rather close proximity of the reactor stable to the clean herd stable, there being only about two hundred yards distance between the two, and, although the care-taker of the reacting herd was forbidden to work in the clean herd stable, he was occasionally found there. This being the case, it was decided in the summer of 1918 to slaughter all reactors then present, and also any which subsequently reacted in the half-yearly tests. Accordingly, all reactors were slaughtered during the summer and tuberculosis varying in extent was found present in every case.

Unfortunately, owing to pressure of other work and lack of help, the fall test, 1918, was not made. In March, 1919, the test was carried out with tuberculin bought the previous fall from

Mulford. Thirty-eight cows and seven six-months-old calves were tested, the calves being given only three-fourths doses. All the cows had been negative in previous tests; the calves were being tested for the first time.

Reaction temperatures were obtained with five cows and six calves. This was a big surprise to the manager, as he was expecting to find the herd clean. The readings were submitted to us for consideration.

With the reacting cows the readings showed that the temperature curve did not begin to rise until fifteen hours after the injection and that in three instances the cows' temperatures had been 102° one hour before injection. The attendant considered that some were in heat and consequently should not have been tested. The rise in temperature above the highest pre-injection temperature varied from 2 to 5 degrees with the differnt animals.

With the reacting calves the temperature curve rose earlier, went higher and was maintained longer than with the cows, a good positive reaction being recorded in each case. The question was raised, were the calves too young, had too large a dose been administered, was the fact that they had been lively and restless responsible for the rise in temperature rather than tuberculosis? In view of these doubts regarding the reliability of the test, we recommended a retest to be made within a week of the first test, a double dose of the tuberculin to be injected.

On the third day after the original test the retest was made on all reacting or suspicious animals.

Of the six calves that reacted to the first test, all reacted strongly to the second. On slaughter five of the six showed well-marked tubercular lesions in the cervical glands, lungs and mesentery glands, and one of them had lesions in the liver; in one case no macroscopic lesions were observed. Stained smears made from the affected tissues showed typical acid-fast *Bacterium tuberculosis.*

Of the five cows that reacted to the original test only one reacted to the retest. This one was slaughtered and showed considerable tubercular involvement of the lungs, mesentery glands, cervical glands and peritoneum. Clinically, however, the cow had looked to be in excellent condition.

Appended are the temperature readings of calves and cows that were retested, both test and retest being recorded.

	P. M.				A. M.			P. M.	
	2.45 °	4.45 °	7.45 °	8.45 °	8.30 °	10.00 °	11.30 °	1.00 °	2.30 °
Calf No. 1, Test	103	101	103	102	102	101	105.3	105.2	105
Retest	100.2	101	101.1	101.1	105.3	105.3	106	105.3	105.1
Calf No. 2, Test	101	101.2	102	102	102.2	102.4	105	105.4	105.3
Retest	101.2	101.4	101.2	101.2	104.4	105.1	106.1	105.2	105.2
Calf No. 3, Test	101	101	101	101	103.1	105.3	106	105.2	104.4
Retest	100.3	100.3	101.1	100.4	100.2	103.1	104.3	105.4	105
Calf No. 4, Test	101.4	101.4	101	101	101	101.2	102.2	104	104.3
Retest	100	100.3	101	100.3	102	103	104.4	104.2	103.4
Calf No. 5, Test	101	100.4	101.2	101.2	101.3	101.1	105	103.1	104
Retest	100.3	101	101.2	101.3	102	103	106.1	103	102.3
Calf No. 6, Test	102	102	102.3	102	102.2	103.2	105.2	105.3	105.3
Retest	101.3	102	102	101.4	104.3	105.2	105.3	105.1	104.1
Cow No. 1, Test	101	101.3	102	101.4	102.3	102.3	104.4	104.4	105.2
Retest	101.1	101	101.2	101.1	102.2	102.2	102.1	102.1	102.2
Cow No. 2, Test	101.3	101	101.2	101.1	101.1	101.4	102	103	104.4
Retest	100.2	100.3	101.1	100.3	102.1	102.1	102.2	102.4	102.1
Cow No. 3, Test	101.3	101.1	102	101.1	101.3	102	103	103.3	104.2
Retest	100.3	101.3	100.4	100.3	101.1	101.1	101.1	101.4	101.2
Cow No. 4, Test	101	101	101.1	100.4	101.4	102.1	103	104	106
Retest	101	101.1	100.2	100.1	101.2	102	102.2	102.2	102
Cow No. 5, Test	101.1	101.3	102	101	101.2	101.3	102.2	103.3	104
Retest	101	101	100.3	101	101	101.4	103.1	104.3	104.2

A TERRIBLE TIMELY TALE.

Mason City (Iowa) Globe Gazette.

Charles City, Iowa, May 22.—Seven years ago a farmer living west of this city hung his vest on a fence in the barnyard. A calf chewed up a pocket of the garment in which was a standard gold watch.

Last week the animal, a staid old milch cow, was butchered for beef and the time-piece was found in such a position between the lungs of the cow that the respiration—the closing in and the filling of the lungs—kept the stem-winder wound up and the watch had lost but four minutes in the seven years.

Lieutenant Orin H. Crossland, who has been on foreign service with the 88th Division, A. E. F., for the past year, has returned to his home in Athens, Ill., and resumed his practice.

ABSTRACTS.

"INJURED INNOCENCE."

A WELCOME TO OUR COLLEAGUES RETURNING FROM THE CAMPAIGN.

R. v. OSTERTAG,
Zeitschrift für Fleisch und Milchhygiene,
Vol. 29, p. 57, 1918.
(Translated by William N. Berg, Washington, D. C.)

With what noble inspiration, with what pride in not needing to remain at home, did all of us, man for man, hurry to the flag in August, 1914, in order to assist in protecting the threatened Fatherland from the enemy! How we have shared sorrows and joys with our comrades from all other callings in civil and military life; in those who had not come in contact with veterinarians an interest in our calling has been awakened and an equality for which we have frequently struggled in vain at home has been attained through this community of sorrow and joy. This and the fact that our Army places honorable reliance in the right of suffrage, are the beacon lights in the struggle just ended. Otherwise, during the four years of the struggle against almost the entire world our Fatherland was overflowing with sorrow and affliction. The fearful terrors of the present war, the sorrows for beloved comrades whom the war devoured, the exhausting worry of the intelligent as to whether Germany can be equal to the newly arising enemies, lastly the United States, with its inexhaustible industrial resources; finally crushed, the man, who like a hero, resisted to the last. And how sorrowful the end! After four years of most heroic and successful struggle against a coalition the like of which the world has not seen before, the downfall occurred only through the concurrence of a series of circumstances arising out of the four year privations at home and in the field. The misfortune is great, but greater is the courage to bear it. You who were in the field until now, return home as heroes, like those who because of wounds or sickness were compelled to seek their homes for recovery. You shall be welcome as heroes and shall be greeted as such upon your home return. May all those who remained home because they could or were obliged to do so, exert themselves in helping you to civil activity and to the reconstruction of all that you have lost during

your absence. In the difficult mountains in Swabia, where human beings are nearer to one another than in the more comfortable plain and city, there is a pretty custom, that everyone who sets up a household is voluntarily assisted by the entire community, so that he may soon have a protecting roof and be able to light a fire in his own hearth. So may all help our colleagues returning with the shield from the field, so that they may be compensated to some extent for what they have achieved and suffered for their home. Be welcome home to work of peace, to the rebuilding of your home life and to the sorely afflicted Fatherland.

RECONSTRUCTION.

R. v. OSTERTAG,
Zeitschrift für Fleisch und Milchhygiene,
Vol. 29, pp. 58-59, 1918.
(Translated by William N. Berg, Washington, D. C.)

After four years' struggle, to which history knows no parallel, Fate has decided against us. In spite of all the sacrifice in blood and fortune, offered so abundantly by the German people during the four years of war; in spite of the unspeakable privations suffered by the homefolk; comes now as the end of it all the prospect of the burden to be borne by the undismayed people. The conditions of the armistice which our opponents have forced upon us give us a foretaste of what ruthlessness, drunk with victory, would impose upon an undefeated and indomitable people. The thought arises that in such a peace not the slightest trace of justice is perceptible and it can furnish no foundation for the mutual understanding between all peoples that are entitled to be classed as cultured—people nor their union by a league of nations toward which our opponents are alleged to be striving.

It is a sad occurrence that the opposing world denies to Germany that respect never denied a brave opponent. And to this respect Germany, who for four years fought against the whole world's human material and industrial production with the heroism of antiquity; whose people suffered for four years for the Fatherland as no people have ever suffered before, has every claim. The opponents' methods of calumny and instigation through senseless tales of horror have apparently misled foreign thought more than we expected from the evident untruthfulness of the enemy's inflammatory press. All these are the woeful conditions at the end of a long war of sacrifice and privation.

But misfortune is not changed by complaint, one is not freed by it. We must courageously assume the heavy burdens of the unfortunate war and resolutely grasp the work of reconstruction with the consciousness that on this earth nothing is permanent except Change and happier days must again follow misfortune.

This is true of the entire people and of us veterinarians in our fields of activity. The practicing veterinarians whose practices have disappeared and savings wasted entirely or in part must courageously begin again at the beginning, supported happily and effectively, let us hope, by all those who were obliged to remain at home during the war. For all of the others who occupied official positions at the outbreak of the war, the provision has been made that these positions be held open to the participants.

In a material way, in the narrower fields of meat inspection and milk control, it is our duty to begin that which, because of scarcity of veterinarians, had to be diminished or discontinued entirely; to gradually restore the previous order; especially the complete veterinary inspection in public abattoirs, the supplementary inspection in the open country; the filling of vacancies for veterinarians in meat inspection positions in order to enable them to settle in places where an existence is not possible without the support of meat inspection. The more diffuse settling of the country by veterinarians is to the general interest, for in order to rebuild our animal industry, so heavily damaged by the encroachments of the war, it is absolutely necessary to have better veterinary service than was possible during the years of war.

I need but mention the great losses of hogs through erysipelas during the war, which made more difficult the already serious food situation; the numerous cases of emergency slaughter of valuable cattle, to which the owners were obliged to resort because veterinary assistance was not available.

Knowing that during the war the available supply of beef cattle and meat must be handled with greatest economy, the meat inspection regulations were so modified and rationally applied that only meat that was really detrimental to health was condemned; and all the rest permitted for use. Such a reasonable practice of meat inspection must be the guiding principle of the expert entrusted with the task of meat inspection. Stricter procedures in cases of defects which are only defects of appearance, where the judgment is left to the discretion of the expert, may be again resumed after the heavy task of rebuilding our herds is

crowned with success. To coöperate is the duty of all veterinarians. Whatever can be used without detriment as food must be made available for human nutrition; all the rest must be rendered useful in obtaining food by being rendered harmless and fed to animals (swine).

The importations of beef cattle and foreign meat, which were interrupted during the war, shall be facilitated, in order that as much nutriment as possible shall be rendered available to the suffering people whose health has been affected by years of undernutrition.

For the repletion of our herds, we need feeds which up to the present time have not been available. Through economy in handling meat, to which must be added the most thorough utilization for human nutrition of all suitable meat, we diminish the inroads upon our herds. Through a most thorough utilization of abattoir by-products in feeding hogs—a universal duty—we spare beef cattle which at present bear the entire load of providing meat; and keep cows whose milk for children, women, the aged and sick, for whom it is a most important, because indispensable, article of diet.

So may everyone work at his part of the severe labor of reconstruction; then, after years of courage and labor, sunny days may again be allotted to us.

Post nubila Phœbus!

A CASE OF HEART DISEASE WITH COMPLICATIONS IN THE HORSE.

(Di un caso di vizio di cuore combinato nel cavallo.)

F. Lenzi.
Il Moderno Zooiatro. Parte Sci. Ser. V., Vol. VII, No. 12.
December, 1918. Pp. 257-264.

This case is reported, not because of its rarity, but because the clinical manifestations did not give clear indications of the pathological lesions discovered on post-mortem examination.

A 15-year-old horse, suffering from epizoötic lymphangitis in a very emaciated condition, presented certain irregularities of circulation and respiration. There was evident dicrotism of respiration and symptoms of emphysema. The pulse was slow, soft, and full, with a certain amount of irregular intermittence, and was visible in the jugular vein. Percussion revealed a restricted cardiac area, consequent upon the pulmonary emphysema. There

was a rough systolic as well as a presystolic murmur. On rectal examination a dilatation of the aorta could be detected.

The clinical signs seemed to point to stenosis of the aorta and relative insufficiency of the tricuspid valve, or aortic insufficiency.

On post-mortem examination the heart, which weighed 3.4 kilogrammes, was enlarged, and the pulmonary artery and aorta were markedly dilated. The wall of the right ventricle was slightly hypertrophied and its cavity considerably dilated. The endocardium, the tricuspid and semilunar valves were normal. The right atrium was dilated, with thinning of its wall. The wall of the left ventricle was considerably thickened (maximum thickness, 5.2 cm.), and its cavity slightly smaller than normal. The endocardium was the seat of a chronic inflammation, which involved the mitral valve and, in a greater degree, the segments of the aortic valve, which were retracted, rugose, and studded with small nodules. The wall of the aorta was thickened and more resistant than normal. Some centimetres from its origin the aorta contained a piriform, pedunculated, mobile tumor of the size of a bean. The lungs were markedly emphysematous.—*Vet. Rev.*

RHINOSTOMY: A NEW OPERATION IN CASES OF PARALYSIS OF THE NASAL DIVERTICULUM.

(Della rinostomia: nuovo intervento operatorio nei casi di paralisi delle false narici.)

F. Cinotti.
Il Nuovo Ercolani. Vol. XXIII, No. 22. November, 1918. Pp. 273-278. 2 Figures.

Paralysis of the "false nostril" is usually to be regarded as one of the symptoms composing the syndrome proper to paralysis of the seventh cerebral nerve. Functionally, however, the nasal diverticulum stands in only minor importance, in respect of lesions, as compared with the ear, eyelids, jaw, and lips; and it is only in cases of complete diplegia that lesions are of semiological value, and because of obstruction to respiration of preponderating importance. Nevertheless, paralysis of the nasal diverticulum may exist alone, though certainly rarely as a unilateral lesion, and very rarely as a diplegia. The condition may be the result of traumatism.

The author has devised an operation whereby the obstacles to respiration (inspiration) produced by paralysis of the "false nostril" may be removed. The operation, for which the name *rhinostomy* is suggested, consists in the formation of a permanent opening into the diverticulum from the exterior. The animal is cast, a local anæsthetic and adrenalin is applied, and, from within, an incision of the lining of the diverticulum, 7 to 8 cm. long, is made so as to bisect the angle described by the free borders of the nasal and incisive bones, beginning about 2 cm. from the apex of the angle and passing forwards from this point. The inner lining of the lateral wall of the diverticulum is carefully freed by means of curved scissors. A similar incision is made through the external skin; the fibro-cartilaginous prolongation of the nasal cartilage (alar fold?) is liberated and amputated at its base, and the external skin and the inner lining of the "false nostril" are stitched together.—*Vet. Rev.*

Tick eradication is still assuming large proportions and the monthly dipping records require from six to seven figures to tell how effectually the various southern states are striving to forever eliminate the dreaded cattle tick.

The month of May, 1919, shows the following number of cattle dippings in the states indicated:

Alabama	1,014,684
Arkansas	695,554
Florida	352,809
Georgia	528,080
Louisiana	1,774,341
Mississippi	532,558
North Carolina	8,422
Oklahoma	612,999
South Carolina	155,487
Texas (north)	1,227,591
Texas (south)	316,679

The creation of the first veterinary scholarship in the name of an honored professor, now known as the James L. Robertson scholarship, at the New York State Veterinary College, New York City, was awarded to a New England student.

A second scholarship at the Veterinary School at New York University is under way to memorialize the name of the late Dean William J. Coates, an alumnus, professor and dean for nearly twenty years of that Veterinary School.

ARMY VETERINARY SERVICE.

FROM THE OFFICE OF THE SURGEON-GENERAL OF THE ARMY, WASHINGTON, D. C.

TRANSFERS AND ASSIGNMENTS OF VETERINARY OFFICERS.

1. Major George H. Dean, V. C., from A. R. D., Camp Wheeler, Ga., to A. R. D., Camp Meade, Md., for duty as The Vet'n.

2. Major Robert C. Musser, V. C., from duty as Camp Vet'n, Camp Lee, Va., to Walter Reed General Hospital, Washington, D. C., for observation and treatment, at the expiration of 3 months' sick leave.

3. Major Chas. H. Jewell, V. C., U. S. A., who has just returned from overseas, where he was assigned as Chief Vet'n, 9th Army Corps, has been directed to report to the Surgeon General of the Army for temporary duty in his office.

4. Major E. W. Hogg, V. C., from duty at Camp Dix, N. J., to Washington, D. C., for temporary duty in the office of the Surgeon General. Major Hogg has just returned from overseas, where he has been serving as Division Vet'n, 79th Division.

1. Captain Edward J. Williams, V. C., from Camp Logan, Texas, to Camp Custer, Mich., for duty as Camp Vet'n.

2. Captain Will C. Griffin, V. C., from Camp Harry J. Jones, Douglas, Ariz., to Camp Fort Bliss, Texas, for duty as Camp Vet'n.

3. Captain Thomas S. Hickman, V. C., from A. R. D., Camp Shelby, Miss., to A. R. D., Camp Kearny, Calif., for duty as The Vet'n.

4. Captain N. M. Crawford, V. C., from duty at Chicago, Ill., to Presidio of San Francisco, Calif., for duty as The Vet'n.

5. Captain P. F. Galloway, V. C., from duty at A. R. D., Camp Hancock, Ga., to A. R. D., Camp Funston, Kan., for duty as The Vet'n.

6. Captain G. B. Huse, V. C., from duty at Camp Veterinary Hospital, Camp Lee, Va., to Camp Lee, Va., for duty as Camp Veterinarian.

7. Captain J. L. Hartman, V. C., from duty at A. R. D., Camp MacArthur, Texas, to Chicago, Ill., for instruction in meat inspection.

8. Captain Jerry L. Ruble, V. C., from A. R. D., Fort Bliss, Texas, to A. R. D., Camp Gordon, Ga., for duty as The Vet'n.

9. Captain C. C. Whitney, V. C., from duty at Dept. Laboratory, Cen. Dept., Fort Leavenworth, Kan., to Fort Sam Houston, Texas, for duty in Dept. Laboratory, that station.

10. Captain J. J. Essex, V. C., from present duty at Camp Meade, Md., to duty as Camp Vet'n, that station.

11. Captain H. H. Beeman, V. C., from Camp Meade, Md., to A. R. D. 318, Camp Sherman, Ohio, for duty as The Vet'n.

12. Captain O. J. Counzelman, V. C., from Camp Custer, Mich., to Fort Robinson, Neb., for duty as The Vet'n.

13. Captain Joseph E. Hodge, V. C., who has just returned from overseas, where he served as Division Vet'n, 29th Division, has been ordered to Camp Benning, Ga., for duty as The Vet'n.

14. Captain Fred D. Green, from Camp Dix, N. J., to Kelly Field, San Antonio, Texas, for duty as The Vet'n.

1. 1st Lieut. J. P. Gerety, V. C., from A. R. D., Camp Sevier, S. C., to A. R. D., Camp Upton, N. Y., for duty.

2 1st Lieut. W. E. Campbell, V. C., from A. R. D., Camp Shelby, Miss., to A. R. D., Fort Bliss, Texas, for duty.

3. 1st Lieut. M. L. Cline, V. C., from duty, A. R. D., Camp MacArthur, Texas, to Chicago, Ill., for instruction in meat inspection.

4. 1st Lieut. G. H. Conn, V. C., from A. R. D., Camp Zachary Taylor, Ky., to A. R. D., Camp Sherman, Ohio, for duty.

5. 1st Lieut. J. G. Fuller, from duty with the 8th Cavalry, Marfa, Texas, to Big Bend District, Marfa, Texas, for duty as The Vet'n.

6. 1st Lieut. S. A. Kamis, V. C., from A. R. D., Camp Bowie, Texas, to A. R. D., Camp Travis, Texas, for duty.

7. 1st Lieut. O. E. Gladfelter, V. C., from duty at Chicago, Ill., to San Juan, Porto Rico, for duty as The Vet'n.

8. 1st Lieut. E. C. Martindale, V. C., from Camp Veterinary Hospital, Camp Lee, Va., to A. R. D., Camp Lee, Va., for duty.

9. 1st Lieut. R. E. Oliver, V. C., from Camp Dix, N. J., to Newport News, Va., Port of Embarkation, for duty.

10. 1st Lieut. F. H. K. Reynolds, V. C., from duty at Dept. Laboratory, Southeastern Dept., Fort McPherson, Ga., to Fort Leavenworth, Kan., for duty in Dept. Laboratory, that Post.

11. 1st Lieut. W. L. Herbert, V. C., from A. R. D., Camp Meade, Md., to Fort Clark, Texas, for duty with the 13th Cavalry.

1. 2nd Lieut. C. W. Barrett, V. C., from A. R. D., Camp Kearny, Calif., to A. R. D., Fort Bliss, Texas, for duty.

2. 2nd Lieut. G. W. Rawson, V. C., from A. R. D., Camp Wheeler, Ga., to A. R. D., Camp Travis, Texas, for duty.

3. 2nd Lieut. R. S. Whitney, V. C., from A. R. D., Camp Sevier, S. C., to A. R. D., Camp Upton, N. Y., for duty.

4. 2nd Lieut. J. R. Houchins, V. C., from Camp Holabird, Md., to Camp Bragg, N. C., for duty as Assistant to the Camp Vet'n.

5. 2nd Lieut. O. C. Schwalm, V. C., from A. R. D., Camp Shelby, Miss., to Camp San Fordyce, Texas, for duty.

6. 2nd Lieut. F. R. Pettys, V. C., from A. R. D., Camp Shelby, Miss., to Hachita, N. M., for duty with the 12th Cavalry.

7. 2nd Lieut. J. S. Davis, V. C., from Camp Sherman, Ohio, to Camp Zachary Taylor, Ky., for duty as assistant to the Camp Veterinarian.

8. 2nd Lieut. R. T. Seymour, V. C., from A. R. D., Camp Hancock, Ga., to Fort Clark, Texas, for duty at that Post.

9. 2nd Lieut. H. Shreck, V. C., from A. R. D., Camp Hancock, Ga., to A. R. D., Fort Sill, Okla., for duty.

10. 2nd Lieut. F. J. Resmenyder, V. C., from duty with U. S. Troops, San Juan, Porto Rico, to Chicago, Ill., for duty at U. S. General Hospital No. 32.

11. 2nd Lieut. J. Nichols, V. C., from Camp Veterinary Hospital, Camp Lee, Va., to A. R. D., Camp Lee, Va., for duty.

12. 2nd Lieut. M. E. Norman, V. C., from A. R. D., Fort Bliss, Texas, to Marfa, Texas, for duty with the 8th Cavalry.

13. 2nd Lieut. T. W. Sprosser, V. C., from Camp Dodge, Iowa, to A. R. D., Camp Funston, Kan., for duty.

14. 2nd Lieut. A. F. Malcolm, V. C., from A. R. D., Camp Funston, Kan., to A. R. D., Camp Meade, Md., for duty.

15. 2nd Lieut. C. A. Moore, V. C., from A. R. D., Fort Bliss, Texas, to Fort Bliss, Texas, for duty with the 5th Cavalry.

16. 2nd Lieut. E. K. Rogers, V. C., from A. R. D., Camp Lewis, Wash., to Fort Robinson, Neb., for duty.

17. 2nd Lieut. T. R. Boyer, V. C., from Camp Dix, N. J., to Marfa, Texas, for duty with the 8th Cavalry.

18. 2nd Lieut. L. E. Miller, from Camp Dix, N. J., to Front Royal, Va., for duty as Assistant to The Vet'n.

19. 2nd Lieut. J. W. Morgan, V. C., from duty at Chicago, Ill., to Camp Lewis, Wash., for duty as Assistant to the Camp Vet'n.

Major Wm. Reid Blair, V. C., was honorably discharged from the Veterinary Corps, May 31, 1919.

Major Blair was commissioned in the Veterinary Corps on November 28, 1917, ordered to temporary duty in the Surgeon General's Office on December 19, 1917, and on December 22 was ordered to Camp Lee, Va., for the purpose of organizing advanced Veterinary Hospital No. 5 for duty overseas. This hospital was composed of 311 enlisted men and seven officers.

After a period of training at Camp Lee and Camp Hill, Major Blair and his organization sailed from Newport News on May 9, 1918, landing at St. Nazaire, France, the latter part of May, 1918. Immediately after landing, his hospital was assigned to duty at Auxiliary Remount Depot No. 1, Base Section No. 1, at St. Nazaire. Finding no adequate facilities here for quarantine and hospital treatment of the large number of animals suffering from strangles, influenza, pneumonia, etc., a series of barracks occupied by French Colonial Troops were obtained from the French authorities, and after these were vacated the barracks

were converted into a model hospital. This hospital was located about three-quarters of a mile from the Remount Station, so that all contagious or infectious diseases were removed from the Remount Depot. After the hospital had been in operation two months, it was visited and inspected by the Commander-in-Chief of the A. E. F., with a number of his staff. The arrangement of the hospital and the work of the organization were highly commended by General Pershing.

On August 1, 1918, Major Blair with his organization was ordered to the Headquarters of the 3rd Army Corps, with station at Mezy-on-the-Marne, for the purpose of assisting in the evacuation of animals during operations in that vicinity.

On August 22, Major Blair with Hospital No. 5 was ordered to the Headquarters of the 4th Army Corps located at Toul. Here, he was assigned as Corps Veterinarian of the 4th Army Corps, and the command of Veterinary Hospital No. 5 taken by Major Nelson.

In his capacity as Corps Veterinarian, Major Blair organized the veterinary service preparatory to the 4th Corps' participation in the St. Mihiel drive during September 12th to 14th. The veterinary service of the evacuation of animals during this drive received the commendation of the Corps Commander, General Dickman.

On Major Blair's recommendation, a number of concrete dipping vats for the prevention and treatment of mange were established throughout divisional areas so that animals could be treated without evacuating them to the hospitals in the rear. This method of treatment was highly successful and met with the hearty approval of the organization commanders who were universally opposed to the complete evacuation on account of no replacements being available during this period.

After the Armistice, Major Blair accompanied the Headquarters of the 4th Army Corps when it became a part of the Army of Occupation in Germany, finally locating at Cochem, Germany, where he remained until relieved by Major English and ordered to the U. S. Major Blair reached the U. S. May 22 on the S. S. "Imperator." Upon his arrival in the U. S., he was ordered to the office of the Surgeon General for report and was discharged May 31, 1919.

Major Blair expressed himself as having enjoyed the Army and as having received the very best kind of coöperation during his service in the A. E. F. Having commanded both veterinary hospitals and the veterinary services of Corps Troops, it enabled him to gain a very wide and valuable experience, and his views on reorganization and the needs of a properly-organized veterinary service have been greatly appreciated.

Major Albert M. Towner, V. C., U. S. A., was honorably discharged from the Veterinary Corps, U. S. Army, on May 31, 1919.

He was commissioned Captain, V. C., N. A., November 22, 1917; reported for duty with the 27th Division at Spartanburg, S. C., December 29, 1917, and assigned to the 54th Infantry as Brigade Veterinarian. On January 24, 1918, he was made Division Veterinarian, 27th Division, when he organized the Divisional Veterinary Service.

Captain Towner sailed with the Division from United States, May 18, 1918, and arrived in France on May 30. Upon arrival in France, the Division proceeded into Belgium, where it served with the British forces in that sector. While there, the Division took part in the Ypres-Lys offensive. It stayed in Belgium until the first week in September, when it proceeded to the sector between Cambrai and St. Quentin, where it took part in the Somme offensive, crossing the Hindenburg line at Bellicourt, September 29, 1918.

Captain Towner was promoted to the grade of Major on August 23, 1918, while he was Division Veterinarian, 27th Division. On October 19, 1918, Major Towner was transferred to the 3rd Army Corps as Corps Veterinarian and remained with this Corps until February 1, 1919, when he was transferred to the American Embarkation Center, Le Mans Area, as Chief Veterinarian. On April 23 he was relieved from duty at the Embarkation Center and ordered to the United States for discharge, leaving Brest on May 15 and arriving in the United States, May 28.

Upon arrival in the United States, Major Towner was ordered to the Surgeon General's office for consultation with the Veterinary Division. He offered some very valuable suggestions regarding the veterinary service, based upon his war experiences.

Major Towner has applied for a commission in the Veterinary Section, Officers' Reserve Corps, and is very optimistic for the future of the veterinary service.

Major Charles E. Clayton, V. C., U. S. A., was honorably discharged from the Veterinary Corps, U. S. Army, on June 4, 1919.

Major Clayton was commissioned in the Veterinary Corps, National Army, November 28, 1917, reporting at Washington, D. C., December 27, 1917, and assigned to the 3rd Division, Camp Greene, N. C., as Division Veterinarian, January 14, 1918.

Division Headquarters sailed from Hoboken, N. J., for overseas service March 31, 1918, and arrived at Bordeaux, France, April 5. The Division immediately proceeded to Chautevillain Training Area, where it underwent a period of intensive training until May 31, 1918, when it was ordered to the Advance Zone in the Chateau-Thierry District, where it entered into active operations that lasted until about July 28, 1918.

On June 28, 1918, Major Clayton was relieved as Division Veterinarian, 3rd Division, and ordered to the S. O. S. as Veterinary Inspector of Veterinary Hospitals and Remounts, with

station at Tours. On August 25, 1918, he was made Corps Veterinarian, 5th Army Corps, stationed at Ben-Noit-Vaux, where preparations were being made for the San Mihiel drive. The Division took an active part in this drive, which was immediately followed by the Meuse-Argonne campaign, from September 25 to November 11, 1918. The 5th Army Corps was ordered to the training area at Nogent-en-Bassigny on November 22, 1918, and when orders were issued for the disbandonment of this corps and return to the United States, February 10, 1919, Major Clayton was transferred to the First Army Headquarters as Assistant Chief Veterinarian, A. E. F., with station at Bar-sur-Aube, reporting on February 24, 1919. The First Army Headquarters was officially disbanded on April 20, and Major Clayton returned to the United States with the Headquarters detachment of officers.

Upon his return, Major Clayton was ordered to Washington, D. C., for consultation with the Veterinary Division, Surgeon General's Office, where he has given most valuable information and assistance based upon his wide experience during the war.

OFFICERS, VETERINARY CORPS, UNITED STATES ARMY.

	On Duty May 11, 1919.	On Duty June 11, 1919.
Colonels	0	0
Lieutenant Colonels	2	5
Majors	75	74
Captains	173	193
First Lieutenants	462	430
Second Lieutenants	503	432
Total	1215	1126

VETERINARY CORPS PROMOTIONS, A. E. F.

The following Majors have been promoted to the grade of Lieutenant Colonel:

1. H. E. Bemis
2. L. A. Merillat, Sr.
3. Reuben Hilty

The following Captains have been promoted to the grade of Major:

1. J. B. Lentz
2. W. C. White
3. H. B. F. Jervis
4. R. W. Smith
5. W. F. Guard

The following 1st Lieutenants have been promoted to the grade of Captain:

1. E. S. Warner
2. J. E. Weigen
3. H. R. Wise
4. D. E. Sisk
5. J. H. Allen
6. J. J. Ash

7. H. V. Baker
8. E. E. Black
9. R. B. Bolton
10. J. D. Eastwald
11. M. S. Esslinger
12. C. M. Gilchrist
13. I. O. Gladdish
14. R. H. Glenn
15. F. B. Green
16. R. A. Halsey
17. J. I. Handley
18. W. H. Haskell
19. L. A. Hock
20. P. H. Hudgins
21. R. K. Knighton
22. L. E. Moore
23. T. F. O'Dea
24. H. E. Pitts
25. H. G. Vanderroest
26. B. C. Bridges
27. B. H. Dunkley
28. W. D. Odou
29. C. S. Parker
30. W. M. Weldishefer
31. H. P. Gill

The following 2nd Lieutenants have been promoted to the grade of 1st Lieutenant:

1. T. E. West
2. E. M. Rundahl
3. H. L. Ragsdale
4. E. L. Peck
5. B. C. Murty
6. F. F. McNeely
7. A. F. Meredith
8. J. M. Lloyd
9. E. P. McBane
10. L. J. Lewis
11. C. J. Lambert
12. O. I. Holloway
13. J. R. Grigsby
14. A. Freer
15. W. France
16. M. E. J. Evans
17. C. H. Doepel
18. F. Cross
19. F. E. Cleaver
20. F. E. Clark
21. F. E. Carroll
22. R. A. Branson
23. M. E. Agnew
24. John McBirney
25. C. A. Beall
26. D. S. Harper
27. W. H. Williamson
28. D. M. Smith

PROMOTIONS IN UNITED STATES.

2nd Lt. M. J. Harkins to grade of 1st Lieutenant.

1st Lt. W. H. Houston to grade of Captain.

The following officers have been discharged from the Veterinary Corps, United States Army, during the past month:

1. Captain Howard C. Gale, who was on duty as the Veterinarian at A. R. D., Camp Sevier, S. C.
2. Captain F. G. Kneup, who has just returned from overseas.
3. Captain R. H. Schrecengost, who has just returned from overseas.
4. Captain F. D. Bertram.
5. Captain A. Moore.
6. Captain I. Myers.
7. Captain Wm. Brod.
8. Captain W. M. Decker.
9. Captain A. E. Hasselbach.
10. Captain W. C. Pulsifer.

The following first lieutenants have been discharged during the past month from the Veterinary Corps, United States Army:

1. F. C. Roach
2. H. A. Wilson
3. J. F. Rogers
4. L. M. Friedline
5. C. D. MacCormack
6. O. S. Pruner
7. E. C. Hughes
8. W. H. Empey
9. O. H. Crossland
10. R. S. Montgomery
11. Wm. F. Nolechek
12. A. D. Kammer
13. G. C. Bevan
14. B. E. Carlisle
15. W. E. Spierling
16. E. R. Worley
17. G. W. Swanger
18. D. L. Procter
19. L. L. North
20. J. T. Connelly
21. J. C. Wheat

The following veterinary officers have resigned from the Veterinary Corps, Regular Army, during the past month:

1. 2nd Lt. Calvin H. Bennett.
2. 2nd Lt. John Von Henry Schantz.

The death of Captain Alexander G. Fraser, V. C., N. A., at Walter Reed General Hospital is reported.

The following second lieutenants have been discharged during the past month from the Veterinary Corps, United States Army:

1. O. H. Welf
2. H. F. Oelschlager
3. V. W. Myers
4. A. P. Sturrock
5. J. W. Herbott
6. J. M. Kerr
7. M. L. Brackbill
8. H. N. Eames
9. J. L. Franz
10. G. Gilbert
11. J. E. McCoy
12. Chas. Thigpen
13. L. B. Barber
14. A. E. Joseph
15. N. J. Pearce
16. A. J. Dickman
17. H. F. Lienhardt
18. C. C. Ettling
19. R. F. Smith
20. S. G. Lindsay
21. D. W. Nicholas
22. W. H. Hauer
23. H. B. Mitchell
24. G. L. Allen
25. E. S. Ring
26. E. E. Lang
27. C. P. Lunneen
28. A. S. Martin
29. J. C. Quinlan
30. C. H. Leavitt
31. G. A. Hazel
32. J. L. Barringer
33. T. G. Kenney
34. J. F. Kane
35. M. E. Norman
36. F. E. Allen
37. R. T. Renwald
38. L. P. Crowe
39. T. H. Howe
40. P. S. Christman
41. J. A. Jensen
42. W. G. Lashbrook
43. D. J. MacLeod
44. G. A. Tucker
45. C. E. Morford
46. C. C. Pemberton
47. H. P. Bonnikson

ASSOCIATION NEWS.

AMERICAN VETERINARY MEDICAL ASSOCIATION.

COMMITTEES MEET IN NEW ORLEANS.

A meeting of the committees of the Southeastern States Veterinary Medical Association and the Louisiana Veterinary Medical Association was held at the Grunewald Hotel, New Orleans, La., May 21, 1919, to perfect plans for the annual convention of the American Veterinary Medical Association.

The meeting was called to order by Dr. E. I. Smith, temporary chairman. A motion to make Dr. Smith permanent chairman, by Dr. Butler and seconded by Dr. Cary, was unanimously adopted. A motion followed nominating Dr. H. C. Hutchens as permanent secretary, which was seconded and unanimously adopted.

The committee on arrangements reported by Dr. Smith that the meeting will be held November 17-21, inclusive, with headquarters at the Grunewald Hotel. Space for the meeting has been secured on the twelfth floor of the hotel, the main assembly room having a capacity of seating 1,200 to 1,500 persons, with various other rooms on this floor for use of committees and secretary. Should it become necessary, two or more rooms can be opened into the main assembly room. From the general discussion of this subject it was apparent that adequate facilities, so far as space and hotel accommodations were concerned, had been arranged for.

The question of the disbursement of funds donated by the various state associations was thoroughly discussed, and, while no move was made for executive action, it was generally understood that the local treasurer, Dr. F. J. Cambon, would pay bills only upon voucher issued by the chairman of the finance committee, and at the close of the meeting itemized statements of disbursements would be rendered to each State Secretary donating for this purpose.

Entertainment for the members, and the ladies in particular, was thoroughly discussed and upon suggestion of Mr. Hill the following program was temporarily adopted:

First Night.—President's reception.

Second Night.—Open.

A Glimpse of St. Charles Avenue, New Orleans.

Third Day.—Luncheon and euchre party at Country Club for ladies.

Fourth Day—Boat ride for all.

Dr. Cambon moved that the Secretary of this meeting write the various secretaries of the southern states associations and find out the amount they propose to donate and collect this amount, then suggest a joint meeting with the budget committee for action. Motion seconded by Dr. Flower. Carried.

Dr. Cary moved that the chairman appoint a budget committee and that this committee, after due consideration, confer with the entertainment committee for the program. Seconded by Dr. Cambon. Carried. The chairman appointed Dr. Tuck, Dr. Cambon and Mr. Hill.

At this time the question of a clinic was brought up by Dr. Cary, who was very much of the opinion that such should be arranged for. Dr. Smith stated that this subject had been fully discussed by the local committee, and it seemed, owing to lack of a suitable hospital, it was impossible to supply a clinic. However, after considerable discussion, it was agreed that the local committee would reconsider this subject, and, if possible, supply the clinic or something to take its place.

Dr. Cary moved that the Secretary of this meeting write each southern A. V. M. A. Resident Secretary and each secretary of

A Portion of Canal Street, New Orleans.

the southern states associations urging the necessity of a concerted effort on their part to secure new memberships at this meeting, that they search the woods for every available candidate for membership. Motion seconded by Dr. Flower and carried.

Dr. Cary moved that the present Chairman appoint a committee for the purpose of conferring and offering such suggestions as seem necessary relative to southern veterinarians on the program of the A. V. M. A. Seconded by Dr. Butler and carried. The Chairman appointed Dr. Cary, Dr. Flower and Dr. Dalrymple.

The question of securing railroad rates was brought before the committee, and as reported by Dr. Smith, this matter has to go through regular channels, which has already been started with every indication for success.

Publicity.—From the discussion of this subject it is quite apparent that this feature has been sadly neglected heretofore. In view of this fact, it was moved by Dr. Butler that a publicity committee be appointed, consisting of Drs. Dalrymple and Nesom and Mr. Seiferth, with stenographers and such facilities as necessary to carry out this move in a thorough manner, the expense of same to be paid for by the local finance committee out of the funds donated for such purpose.

Badges.—Reports so far show that nothing definite has been adopted, but during the discussion the fact was revealed that in Dr. E. Pegram Flower the profession has a member with a rare artistic talent. The Secretary was unable to describe what Dr. Flower gave a description of, but it made such a hit with the committee that its action was unanimous in that the Chairman appointed Dr. Flower as a committee of one to confer with the committee on badges and program, and recommends that his design be adopted.

There being no further business, a motion to adjourn by Dr. Tuck, seconded by Dr. Butler, was carried.

The following members of committees were in attendance:

Dr. F. J. Cambon, 303 Title Guarantee Building, New Orleans, La.

Dr. E. Pegram Flower, Box 24, Baton Rouge, La.

Dr. R. W. Tuck, 323 New P. O. Building, New Orleans, La.

Dr. C. A. Cary, Auburn, Ala.

Mr. T. J. Hill, Association of Commerce, New Orleans, La.

Dr. J. U. Upton, Donaldsonville, La.

Dr. E. I. Smith, Baton Rouge, La.

Dr. H. C. Hutchens, Atlanta, Ga.

Dr. Tait Butler, Memphis, Tenn.

Dr. Albert W. Vornheder, 1150 North Carrollton Avenue, New Orleans, La.

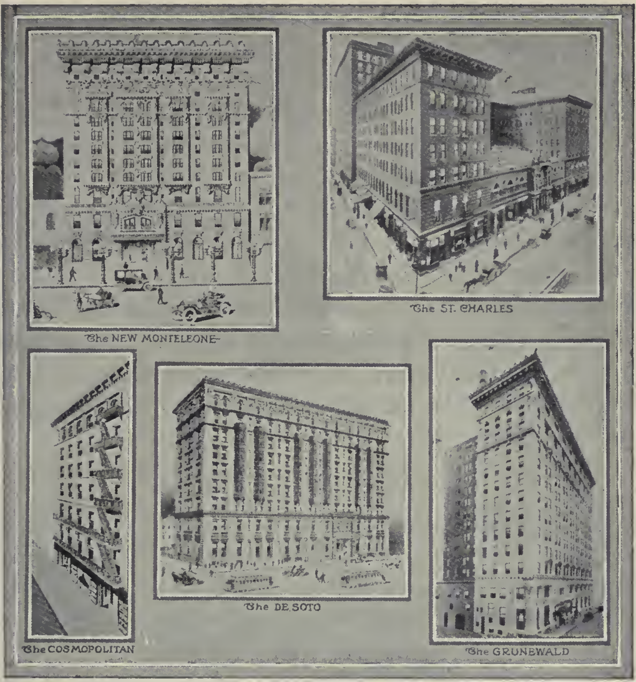
H. C. Hutchens, Secretary.

HOTEL INFORMATION.

In this issue it is much pleasure to present to the readers of the Journal two splendid views of New Orleans, including the residential and business section, together with a group picture of various hotels in the city.

Following is a list of the names of the hotels with detailed information which should be useful in case members decide to make comfortable reservations. In the event any member should desire to engage rooms in advance he is urged to do so at an early date, stipulating the occasion, how many will occupy the same room, and, if for ladies, due consideration will be extended relative to location and other conveniences.

Grunewald Hotel.—University Place, off Canal Street, 500 rooms. Headquarters for the A. V. M. A., November 17-21. Single room without bath for one person $1.50 per day, for two $2.50 and up; single room with bath for one person $3.00 per day, for two $4.00 and up. Double room without bath for one person



A Group of New Orleans Hotels.

$2.00 per day; for two $3.00 and up. Double room with bath for one person $4.00 per day; for two $5.00 and up.

St. Charles Hotel.—St. Charles and Common Streets, 500 rooms, 3 blocks from headquarters. Room occupied by one person, without bath, $2.00 to $3.50; with bath, $3.00 to $7.00. Two persons, without bath, $4.00 to $6.00; with bath, $5.00 to $10.00. Parlor, bedroom and bath, $10.00 to $25.00.

Hotel Monteleone.—Royal at Iberville Streets, 400 rooms, 3 blocks from headquarters. Single room without bath for one person, $1.50 per day and up; with bath, $2.50 per day and up. Double room without bath for two persons, $2.50 per day and up; with bath, $3.50 per day and up.

Hotel De Soto.—Baronne at Perdido Street, 300 rooms, 4 blocks from headquarters. Single room without bath, $1.50 per day and up; with bath, $2.50 per day and up. Double rooms without bath, $2.50 per day and up; with bath, $3.50 per day and up.

Cosmopolitan Hotel.—120 Bourbon Street, 100 rooms, 2½ blocks from headquarters. Single rooms without bath, one per-

son, $1.00 per day and up; with bath, $2.00 per day and up. Double rooms without bath for two persons, $2.00 per day and up; with bath, $3.00 per day and up.

Lafayette Hotel.—St. Charles and Lafayette Streets, 80 rooms, 6 blocks from headquarters. Single room without bath for one person, $1.50 per day and up; without bath for two persons, $2.50 per day and up; with bath, one person, $2.00 per day and up; with bath, two persons, $3.00 per day and up. Double room with bath (twin beds), $5.00 per day and up.

Planters Hotel.—Dauphine and Iberville Streets, 75 rooms, 3 blocks from headquarters. Single room without bath, one person, $1.00 per day and up; with bath, one person, $2.00 per day and up. Double room without bath, two persons, $2.00 per day and up; with bath, two persons, $3.50 per day and up.

RAILROAD RATES.

The question of reduced railroad rates is still receiving careful attention and members of the Association may feel assured that those who are delegated with the responsibility of negotiating with the railroads will continue to use every resource available to the end that satisfactory rates may be secured.

For the time being the Railroad Administration is authorizing one and one-third fares on the certificate plan, but is limited to certain organizations only, notably, fraternal, religious, educational, charitable, or military organizations, which would not include such meetings as the A. V. M. A. However, the Administration is confident that the usual winter excursion fares will be in effect during the time our Association is in session, but can not give definite information until about September or October. In the meantime, the members will be kept well posted regarding any new developments, but from the present indications it is firmly believed liberal concessions will be obtained. Therefore, all should decide, early, to attend, or, in other words, be in readiness to accept any good news in the form of rates, which always comes as an agreeable surprise. All aboard for the A. V. M. A.

E. I. Smith,
Secretary-Treasurer and Chairman,
Committee on Arrangements,
Louisiana Veterinary Medical Association.

OUR DUTY TOWARD CONSTRUCTION.

It is an undeniable fact that history frequently repeats itself. In many instances we sincerely hope not, but in some others we eagerly look forward to the time when it will *repeat* with greater force.

We have gone so far as to set the time and the place—New Orleans, November 17, 18, 19, 20, 21, 1919.

At the 50th annual meeting of the American Veterinary Medical Association, the majority expressed a desire that something definite should be done to trace in writing the half-century of progress made by the veterinary profession in America.

In the meantime, we are busy making history which will be placed at the disposal of some one richly endowed with epistolary gifts.

Let us do this energetically, definitely, sincerely and hopefully for the supreme dignity of the veterinary profession.

Each battle should be a decisive one, and each year the Association meets every member should ask himself, what have I done to help the profession have its achievements carved in imperishable letters on the facades of time?

The great conflict for democracy is over. For us, it lasted one year, seven months and five days, and in that time seventy-two thousand Americans died in France.

The veterinary profession generously contributed its share all for humanity and the eternal happiness of mankind throughout the world.

The history of the second fifty years of the profession will occupy a volume dedicated to the veterinarians who gave all and who served unstintingly that we might forever live in the golden atmosphere of "Peace on earth and good will toward all men."

We hope all the boys who wore khaki and so gloriously supported the cause of freedom will be home by November, and, moreover, will be attendants and participants at the 56th annual meeting of the A. V. M. A., November 17, 21, inclusive.

E. I. S.

PRESIDENT MOORE APPOINTED DR. KLEIN.

President V. A. Moore appointed Dr. L. A. Klein, Dean of the Veterinary School of the University of Pennsylvania, as a delegate to represent the American Veterinary Medical Association at the annual meeting of the American Association of Pharmaceutical Manufacturers held in Atlantic City June 2.

WORK ON THE PROGRAM.

Work on the program for the 1919 meeting of the American Veterinary Medical Association is already on the way. Dr. A. S. Cooley of Cleveland is chairman of the section on General Practice (medicine and surgery), and Dr. L. Enos Day of Chicago is chairman of the section on Sanitary Science and Police. We are anxious to provide an interesting and practical program. If any members of the association have anything they would like to present at this meeting we shall be glad to hear from them. Please advise either Dr. Cooley, Dr. Day or the Secretary. If you have something that will be interesting and helpful to the members, get it in shape as soon as possible. Every one must do his part and not "Let George do it."

NELSON S. MAYO,
Secretary.

THE SENSE OF HUMOR.

One of our good friends, a lady tall and very thin, exceptionally so, tackled a Mr. Murphy about his horse in her home town, not far from Boston. "Mr. Murphy," she said, "your horse is poor. If you don't feed him better I shall complain of you." "Miss B——, I do feed the horse, he gets nine quarts of oats a day and plenty of hay." "I don't believe you. Any creature that got enough to eat would look plump and fat." "Well, thin, Miss B——, it's mighty little ye're after gettin' yerself." That ended the conversation, but we saw that Mr. Murphy lived up to his reported ration for his horse.—Our Dumb Animals.

Captain E. R. Steel of the Army Veterinary Corps is now commanding officer for the American students who were at the Royal (Dick) Veterinary College at Edinburgh, Scotland. Captain Steel writes that he is taking a two months' post-graduate course, covering laboratory diagnosis in pathology and bacteriology from the practitioner's point of view. He says they will also get some work in making bacterins and in special milk and water examinations. There are thirteen American veterinarians taking this course. Captain Steel hopes to return to the United States some time in July, but as he says, "orders dictate one's whereabouts, mode of life, and existence." He also states that they have learned to appreciate America as never before.

OTHER ASSOCIATIONS

ASSOCIATION OF STATE AND PROVINCIAL VETERINARY COLLEGES.

REPORTS OF COMMITTEES.

COMMITTEE ON METHODS OF TEACHING PARASITOLOGY.

General Statement.

The members of the Committee on Methods of Teaching Parasitology have accepted the work delegated to them by our President, Dr. H. S. Murphey, with pleasure, but not without a keen appreciation that they were not wholly prepared to do full justice and credit to the problem. Each of the members of the committee has had experience in teaching Animal Parasites and has given to this report his best judgment in the light of his experience and general information. The members of the committee were agreed from the first that we should present a general comprehensive report to which we would all be willing to sign our names. We have succeeded in doing this in regard to every phase of the report with but one exception, which will be explained under the division of the subject designated symptoms and clinical differential diagnosis, diagnosis and treatment.

The fact that animal parasites are important as disease-producing agents has been known for a great many years. The amount of time given to the consideration and study of the question of parasitism, however, has varied greatly during different periods; at times it has been looked upon as one of the most important factors to be dealt with, while at other times it has received almost no attention, and parasites have been looked upon as more or less unimportant as disease-producing agents. As the necessity for the protection of our live stock from disease has grown, largely because of the general laws of supply and demand, and because of the rearing of animals, under more or less intensive conditions, and because of the modern commercial method of handling animals for food purposes, and because of the very general interchange of breeding stock, and because of the numerous stock shows, etc., there have been brought about conditions that make possible the spread of parasitic diseases; and thus parasites, as well as all classes of disease-producing agents,

have of necessity received attention. While the full importance of many animal parasites was not fully appreciated until more or less recent years, our knowledge regarding them has been gradually added to both as a result of natural infestations and experimental work, until today we have come to understand the very great importance of parasitism and animal parasites in relation to the cause and spread of disease among both man and animal.

Studies in parasitology, as strictly veterinary, have been introduced into practically all courses in veterinary medicine within the last ten or fifteen years. This, together with the great amount of work being done and the discussion that is taking place on the question of animal parasites, and the fact that the matter is up for consideration before this association, speaks sufficiently for the importance of this subject and the attention that it is receiving by the medical world.

The object of this report is briefly to outline a systematic plan for a method of teaching parasitology to veterinary students with the object of adequately covering the subject and at the same time of not encroaching upon the time which it seems essential to devote to other studies. This becomes a very difficult problem when we stop to consider *the large number* of animal parasites affecting the *different species* of *domestic animals* which must necessarily be covered or dealt with in a course in veterinary medicine. In that the subject can only receive its apportioned amount of time as related to other subjects in any given veterinary curriculum the general tendency to limit the number of credit hours a student can carry, and the introduction of new work in connection with the war, make it necessary for one teaching parasitology to be very careful in the *arrangement of the subject matter which is to be given.* This includes the laboratory work, the subject matter of the lectures, the selection of the parasites and organs to be used for study and demonstration in the laboratory work and the listing of references. In those cases where condensed and up-to-date material is not available for reading, the instructor should compile such material for the students with the object that a maximum amount of ground may be covered in a minimum time. Time may further be conserved by the use of drawings and charts in connection with fresh and preserved specimens studied in the laboratory by the study and comparison of tissue changes resulting from animal parasites with lesions due to other causes in all classes in path-

ology, and lastly by having the students make personal use of all the parasites and parasitic conditions met with in the animals that come under their observation in the clinic and post-mortem work. Such procedure is strictly clinic work, is supplementary to parasitology, and is the ideal way for a student to become familiar with all phases of a particular form of parasitism.

Preparation of the Student.

In taking up the subject of parasitology with veterinary students it is essential that they have had some general and fundamental work in zoology. The teacher must assume this. The work in general zoology given to veterinary students should be of such a nature as to familiarize them with methods of study, classification, life history, biological laws, morphology, and the general principles of zoology, including both vertebrates and invertebrates, in a way that would serve as a foundation to the principle of structure and function in anatomy and physiology, and to the study of the various forms of life parasitic to our domestic animals. If this suggestion were to be carried out, it would mean that the work in zoology offered to veterinary students in most of the departments of zoology in the various institutions in the country would have to be especially outlined for veterinary students, as any one of the various studies for beginners in zoology offered to students in other courses is too general, too limited in its scope and is arranged as one of a series of studies, one being prerequisite to the other. To overcome this difficulty the Department of Zoology at Iowa State College offers work in zoology to veterinary students complete in itself and outlined to meet as nearly as possible the special needs of the student pursuing work in veterinary medicine.

Classification of Animal Parasites.

Inasmuch as there seems to be no better way for veterinarians it is undoubtedly absolutely essential that we should classify and study animal parasites as they are classified in systematic zoology. The veterinarian should be able to place in its proper zoological position any known parasite. After the student has become familiar with the zoological grouping of the various forms he will be able when engaged in the practice of veterinary medicine to deal without confusion with parasites according to the species of animal attacked or according to the part invaded; for example, intestinal and lung parasites; but unless the individual con-

cerned is able to place the parasite under consideration in its proper zoological position, he will not make much progress in a scientific way. The proper classification of a parasite is, of course, more or less essential to diagnosis, treatment and prevention. The various forms of animal life to be dealt with in parasitology offer a very definite and characteristic morphology, as well as conform to definite biological laws; therefore, we would emphasize that the various forms of animal life found parasitic to our domestic animals should be looked upon as a group of disease-producing agents to be classified and studied as thoroughly and systematically as are microörganisms. When the student has completed the study he should look upon and have an understanding of animal parasites as comparable with that which would be expected of a student completing studies in pathogenic microbiology, or of a student of systematic and economic entomology.

The Ground to Be Covered.

The subject matter of the study of parasitology should be covered by means of lectures, laboratory work, demonstrations, and reference reading. The subject matter to be covered by lectures must, of necessity, be condensed, systematically arranged, and, while it should not include a species description of the parasite, it should include generic characters. The species description takes a great deal of time, and can be much better handled by being given in the form of a printed outline for use in the laboratory. For example, in taking up the ascaridæ, the lecture work would cover briefly the group, class, order, family and genus with a list of the different species. From this point the lecture work would include the question of ascariasis in all species of domestic animals as outlined later. The laboratory work should consist of an examination of the more important animal parasites with special emphasis on the morphology for purposes of identification, for an understanding of the injurious action of the parasite and those morpholgical structures which have to do with reproduction, life history and indirectly with methods for control. The laboratory work should further consist of demonstrations of gross specimens of the parasite and tissues showing lesion. In many cases histological preparations are indicated and all can be supplemented to good advantage by the use of charts, drawings, and lantern slides in the lecture room or laboratory. The reference reading assignment must be definite

and not require that a student read extensively to obtain a minimum amount of information.

The Scope of the Work.

The subject of parasitology as taught to veterinary students should include only those forms of animal life that are visible to the naked eye, except for the few cases cited below, or, in other words, it should not attempt to cover microörganisms, even though many such are in the animal kingdom. Realizing from experience that there will of necessity be some overlapping, it is to be counted as a gain to the student rather than a loss or unnecessary duplication; for example, piroplasma, trypanosoma, coccidia, sarcosporidia and all microscopic forms, even though they seem to have a protozoan relationship, should be dealt with in bacteriology or microbiology and only indirectly referred to in parasitology. A discussion on animal parasites to be complete must, of course, include the lower forms of animal life, but our point is, while we would in a general way and in our classification include the above microscopic forms, we would leave specific information and detailed study of these forms to the study of microbiology. On the other hand, acarina (Ex. demodex and laminisioptes cysticole), which require magnification to determine, should be looked upon as belonging strictly to parasitology. Local conditions as they exist in the various institutions might logically call for some variation in this regard.

Morphology.

The work in parasitology should be such as to familiarize the student with the morphology of the adult parasite, including external and internal structures, but especially such external markings as size, structure, etc., that will be useful in the identification of the parasite. Morphology should further include the organs of reproduction, eggs or ova, embryoes, larval and pupal forms, as well as the adult. In fact, any markings or structures, including all *stages* of *development characteristic* of different forms, that would in any way be of value in identifying the parasite or form of parasitism and that have a bearing on methods of control should be included.

Life History.

Since the control and eradication of animal parasites is largely a matter of prevention, it is essential that the student be familiar with every phase of the life history, including the atmos-

pheric and climatic conditions and geographical and geological formations favorable to their existence, continuation and spread. In taking up the life history of parasites we should start with the eggs, ova, and embryoes as they are formed or as they leave the adult, and trace them through their various stages of development and migrations as far as known until they have reached the host of the mature parasite and are again producing new genertions. We must impress upon the student that the great advantage and often the only possible way to success in combating certain parasites is to direct our efforts at the stage of development most susceptible to destruction and that successfully and intelligently to carry this out we must be familiar with the *morphology* of *every stage* of *development* and the *complete life history* of the parasite. When considering the life history, the following points will necessarily come up for consideration:

(a) Is it necessary for the young to leave the host to complete its life cycle?

(b) By what channels and under what conditions are the young forms expelled from the body?

(c) What is the location in nature?

(d) Is an intermediate host necessary?

(e) What is the length of time and condition under which the young may remain outside the body of the host and still survive?

(f) How do the different forms gain entrance to the body?

(g) What are the different stages of development, metamorphosis?

(h) At what stage or stages is the parasitic action exerted?

(i) By what method does it become located in a particular organ or structure, its migrations in the body?

Action of the Parasite.

What is the parasitic effect of the parasite upon the host?

In what way is the particular species injurious outside its direct or strictly parasitic action?

Does the parasite carry infection directly or indirectly?

Lesions.

What structural changes and lesions resulting from the presence of the parasite, its method of feeding, its migrations, and forms of growth?

What lesions are typical of the parasite?

What is the pathology of the lesion after the parasite has left?

What must be considered in carrying out steps in the differential diagnosis of lesions?

Symptoms, Treatment and Prevention.

These are the points upon which there were slight differences of opinion in the committee as to just where the final word should be said. Some are of the opinion that these points should be covered in detail by the instructor giving the work in parasitology, while others are of the opinion that this phase of the subject should be dealt with in theory and practice (medicine). Granting that local conditions, especially in regard to the teaching staff of the different veterinary colleges, might call for some variation, it is generally felt that in some one study some particular instructor shall give in detail and emphasize the importance of the clinical symptoms. It would seem only logical that this should be left to the man teaching clinical medicine. In therapeutics and sanitary science, for example, we see no reason why other than mere mention of the form of parasitism to be dealt with is necessary. The students already have or will have information regarding parasites from their studies in parasitology. The instructor, for want of time, if for no other reason, must accept the student's information or assume that it will be acquired later; certainly, he should not attempt to give it. On the other hand, the time allowed to the study of animal parasites does not permit of a complete and thorough discussion of symptoms, treatment and prevention, and the man teaching the subject is, as a rule, not especially prepared to do this. Finally, it seems only logical that this should be dealt with by the teacher in theory and practice on the same basis that he would discuss the symptoms, treatment and prevention for other diseases.

The student following his completion of parasitology and of studies such as microbiology, physical diagnosis, therapeutics, and sanitary science should be prepared to take up in theory and practice and clinics every phase of parasitism, and should be able to understand and carry out methods of clinical diagnosis, prevention and treatment.

To summarize, the man teaching parasitology should cover all phases of the subject in more or less detail as outlined above, with the exception of the clinical symptoms, treatment and prevention. In the case of the latter the teacher of parasitology

will in many instances find that the symptoms and lesions are so connected and associated that they must be discussed together. Again, prevention is so completely dependent in many cases upon a thorough knowledge of the life history that in order to stimulate the student to the importance of knowing the life history, the fundamental principles of prevention must at least be mentioned. On the other hand, the teacher of the study, theory and practice (medicine) should take up and emphasize the *symptoms* of parasitic disease, the *treatment* and methods for prevention, and be held responsible for the final rounding out of the student's knowledge of this phase of the subject; in short, he should deal with these points the same as he does with identical points in other diseases. The teacher of theory and practice should take up any or all phases of parasitology that may help to make the diagnosis and treatment of individual cases and the handling of outbreaks practical and successful. He should give a general summary of all phases of the subject, and fix the important and essential points in the student's memory so that they will remain forever a useable part of his knowledge of diseases of domestic animals.

J. W. Kalkus,
A. G. G. Richardson,
W. W. Dimock,
Committee.

Committee on Clinical Diagnosis and Sporadic Diseases.

The subject assigned to your Committee on Clinical Diagnosis and Sporadic Diseases can not reasonably be considered in its entirety in one report, since it embraces separate and distinct lines of thought, each of which is worthy of special consideration. For this reason the report will be made in sections, consisting of a collaborate report on clinical diagnosis and another on teaching of sporadic diseases, prepared by Dr. J. N. Pringle.

Teaching Clinical Diagnosis.

A rather superficial investigation has caused your committee to assume that in most of the veterinary colleges of America the teaching of clinical diagnosis has been sadly neglected. In fact, it seems that in most instances it is not taught as a prescribed course but is practiced at the clinic for the benefit of students and generally by the "snap judgment" method. This

method inevitably portends disaster for the practitioner and must be looked upon as inexcusable in a modern system of pedagogy. The ability through knowledge and experience to correctly interpret symptoms of disease constitutes the very foundation of the practice of medicine and at all times distinguishes the scientifically trained devotee from the mere pretender. Why so little attention has been paid to the science of diagnosis is problematical. It seems to be one of those strange and seemingly unaccountable incongruities that have been revealed from time to time in our modern systems of education and which arise unexpectedly to mock and accuse us of pedagogic myopia.

It is a well-known and generally recognized principle that "practice makes perfect." In other words, proficiency in any line of human endeavor is invariably commensurate with the degree of thought and experience associated with it. The art of diagnosis rests upon the sciences which underlie it, but for correct interpretation must depend upon experience more than any other factor in correlating evidence, by giving proper weight to symptoms.

Symptoms of disease are observable deviations from normal physical conditions. In order to correctly observe, recognize and weigh the symptoms of disease, all of the faculties involved must be cultivated and this necessitates time and specialization in training. Diagnosis is the art of recognizing disease and in distinguishing one disease from another. In substance it is determining the symptoms and by deduction locating the diseased organ, defining the character and extent of the disease, and naming it in appropriate terms. It is doubtful if much credit should be given to the mooted claim of intuition in diagnosis which is not based upon a knowledge of anatomy, physiology, pathology and other fundamental sciences. The proficiency which a few have acquired in diagnosis is easily accounted for by their profound knowledge of the subject acquired by study and experience.

Before undertaking this report, your committee felt the need of information as to how clinical diagnosis has been taught in the state colleges of America, and to this end the following letter was addressed to each of them:

"The Committee on Diagnosis and Sporadic Diseases, appointed by the chairman of the Association of State and Provincial Veterinary Schools, wishes information on which to base its

report. There is a noticeable lack of method in presenting clinical diagnosis in some of our state and provincial veterinary colleges. In order that we may present this subject intelligently at our next meeting, it is quite necessary that we have your co-operation. To this end will you kindly answer the following questions or otherwise express your views on this important subject?

A—Do you favor a systematic outline of procedure in teaching diagnosis for hospital clinic and out clinic?

B—Will you favor us with an outline of the method you are using in presenting this subject?

C—To what extent are case reports made, filed and used subsequently for instruction or publication?

D—Should diagnosis in most cases be verified by special and specific laboratory tests?

E—Should special hours be scheduled for didactic presentation of the theory of diagnosis?

F—How much time should be devoted to clinical diagnosis and where in the course should instruction begin?

G—Please give us a brief outline of how in your opinion this subject can best be presented?"

From three colleges only were answers received which were helpful and which manifested a commendable interest in the matter. We find, however, that in the majority of colleges an out clinic is not undertaken. A few offer a free clinic, while others through deference to local practitioners, and for other reasons, are making a nominal charge for surgical cases and where treatment is prescribed. The majority of state veterinary colleges are located in cities of the second or third class, and have a small but varied clinic. Where the clinical material is limited it becomes necessary to use it to the best possible advantage and it seems certain that each case presented has possibilities for instruction which are not always utilized. For instance, after a general and special examination, infectious cases, and many that are not infectious, may be taken to the laboratories for specific examination of diseased tissue, secretions, excretions, parasites, or for bacteriological study. When the laboratory reports are handed to the clinician the case reports may be taken from the files, the laboratory and therapeutics reports added, and the case reviewed before the class. This procedure would be making the most out of clinical material in that it would lay before the student a comprehensive view of the case in its entirety; the final report of the results of the treatment given would lend an added interest, and the review of the case, with comments by the clinician, would certainly be worth while.

Recommendations.

A—A Systematic Procedure in Clinical Instruction.

An absolutely restricted outline of procedure for instruction in clinical diagnosis is not considered feasible because of the uncertainty and varied character of clinical material. However, a general scheme should be worked out to follow as closely as circumstances will permit. Instruction might be considered under four distinct phases:

1. The theory of diagnosis, given by a course of lectures or using a text such as Malkmus' Clinical Diagnosis. This work should begin with the sophomore year and continue as a two-hour subject for one semester.

2. The second semester of the sophomore year should provide for a two-hour laboratory period devoted to demonstrations. For this purpose normal animals should first be used and then for comparison. This period should be devoted largely to a study of symptomatology and for practice in the art of making physical examinations. In this way the various systems are thoroughly gone over and the student should become familiar with correct methods of examination. This course could perhaps be more appropriately given by the physiologist.

3. Beginning with the junior year and throughout the remainder of the course sufficient time should be provided each day to make the most out of all available clinical material. Students should be given diseased animals to work out their own diagnosis.

B—Clinicians.

To the end that students may profit by the knowledge and experience of all of the teaching staff it is especially recommended that all veterinarians of the faculty participate in the clinic. Infectious cases would naturally be assigned to a member of the bacteriological department, obstetrical cases to the obstetrician, parasitic cases to the professor of parasitology, etc.

C—Out Clinic.

Practice in clinical diagnosis being considered paramount, the hospital clinic should be supplemented by out clinic for higher classmen. This can be accomplished:

1. By taking groups of students to see cases in the city or adjacent country.

2. By encouraging students to spend their vacations as assistants to reputable practitioners.

3. By students seeing cases in company with local practitioners.

4. Giving a part of the course in a city where clinical material is abundant.

5. A few months' compulsory clinical tuition with reputable practitioners.

There are serious objections to all of these conditions and some of them, even though they could be accomplished, are not to be recommended. Conditions are not the same in any two instances and each college will need to work out its own problems. The problem of providing an ample clinic is a vital one and no class should be considered as fit candidates for graduation until it has had a most thorough training in the science and art of diagnosis.

D—Hospital Clinic.

Clinical work is naturally divided into two phases:

1. Didactic instruction and physiological practicums throughout the sophomore year.

2. General clinic covering the last two years and occupying not less than two hours daily. This includes (a) consultation clinic, or cases entering and available during the clinical period only, and (b) care of surgical and medical hospital patients.

The usual practice, and one which is recommended, is to assign cases to seniors with junior assistants. Students so assigned to see that the treatments prescribed are carried out and such attention given to their respective cases that they are prepared to give a full report of the same at a subsequent clinic period.

E—Clinical Reports.

Reports should be made each day and records kept of each case from the time that the case is entered on the hospital books. Printed forms should be used and filed for future reference. The accuracy, neatness, and completeness of these reports should be used in grading of students on this subject. The printed forms should provide for reports on:

1. Daily clinic records.
2. Surgical records.
3. Anesthetic records.
4. Diagnosis.

5. Remarks, where comments may be made and things of special interest recorded.

F—Departmental Correlation.

Correlation of departments to the end that one subject would be under consideration in all departments at the same time would be ideal but practically impossible. It is possible, however, to have a high degree of coöperation. For instance, if the circulatory system is under consideration in the clinic, class arrangements might be made for review of the physiology and anatomy of the same in their respective departments. In infectious or communicable diseases laboratory tests should be made to confirm the diagnosis, and this should be the rule and not merely done in exceptional cases of doubtful diagnosis. A larger use of the laboratories in case of non-infectious diseases is recommended, such as pathological and histological examination of diseased tissue, examination of secretions and excretions, urine, blood and milk analyses, etc.

G—Filing and Use of Case Reports.

Case reports should be filed for future use. Those of special significance or which are typical of certain diseases may be used in teaching those diseases and those which it is believed will be of value to clinicians and practitioners should be reported for publication.

We do not feel that this report should be concluded without repeating and thus emphasizing the importance of giving clinical diagnosis a larger place in our veterinary curriculum. To secure the best results, this course, like all others, must be dominated by a scientific system of presentation. We should ever be mindful of the old truism, "The treatment of a disease should not be given to a man who can not make the diagnosis."

Geo. H. Glover,
J. N. Pringle,
R. P. Marsteller,
Committee.

MINNESOTA STATE VETERINARY MEDICAL ASSOCIATION.

Following is the program of the twenty-first semi-annual meeting of the Minnesota State Veterinary Medical Association,

to be held in the Chamber of Commerce rooms, Brainerd, Minn., Wednesday and Thursday, July 9-10, 1919:

OFFICERS — 1919-1920.

President—Dr. C. A. Nelson, Brainerd.

First Vice President—Dr. H. A. Greaves, Glenwood.

Second Vice President—Dr. A. J. O'Hara, Northfield.

Secretary-Treasurer—Dr. C. P. Fitch, St. Paul.

Board of Trustees—C. A. Nelson, Brainerd; W. A. Anderson, Sleepy Eye; A. F. Lees, Red Wing; E. B. Carter, Austin; C. P. Fitch, St. Paul.

COMMITTEES — 1919-1920.

Colleges—H. C. H. Kernkamp, chairman; C. Cherry, H. G. McGinn.

Infectious Diseases—M. H. Reynolds, chairman; M. J. Sexton, M. S. Whitcomb.

Finance—G. E. Metger, chairman; E. H. Kartsrude, A. O. Rustad.

Legislation—R. J. Coffeen, chairman; A. F. Lees, W. L. Boyd.

Bacteriology—W. L. Beebe.

Surgery—W. C. Prouse, chairman; T. Lambrecht, W. C. Bromaghin.

Medicine—E. N. Schoen, chairman; H. A. Greaves, C. J. Sigmond.

Resolutions—M. R. Higbee, chairman; J. H. Elmer, J. N. Gould.

Salmon Fund—G. Ed. Leech, chairman; E. T. Frank, C. E. Cotton.

Stallion Registration—C. S. Shore, chairman; W. A. Anderson, C. A. Nelson.

WEDNESDAY.

Meeting of Board of Trustees at 9:30 a. m. in Chamber of Commerce rooms.

Meeting of the association called to order at 10:30 a. m. in Chamber of Commerce rooms by President C. A. Nelson.

ORDER OF BUSINESS.

Reading of the minutes of the last meeting.

Address of the President.

Secretary's report.

Treasurer's report.

COMMITTEE REPORTS.

Colleges—Dr. H. C. H. Kernkamp, chairman.

Infectious Diseases—Dr. M. H. Reynolds, chairman.

Finance—Dr. G. E. Metzger, chairman.

Legislation—Dr. R. J. Coffeen, chairman.

Bacteriology—Dr. W. L. Beebe, chairman.

Surgery—Dr. W. C. Prouse, chairman.

Medicine—Dr. E. N. Schoen, chairman.

Salmon Fund—Dr. G. Ed Leech, chairman.

Stallion Registration—Dr. C. S. Shore, chairman.

Resolutions—Dr. M. R. Higbee, chairman.

Report of Board of Trustees on applications for membership.

Election of new members.

Unfinished business.

Miscellaneous business.

Afternoon.

Meeting called to order.

Reading of papers:

The Practice of Obstetrics in Swine, Dr. J. N. Gould, Worthington.

The Control of Hog Cholera and Some Other Infectious Diseases of Swine, Dr. C. N. Hackett, Bureau of Animal Industry, South St. Paul.

Animal Husbandry and Veterinary Practice, Dr. C. W. Gay, University Farm.

Evening.

Address of Welcome—Mr. F. E. Little, Mayor of Brainerd.

Response—Dr. C. P. Fitch, University Farm.

Live Stock Sanitary Control Measures, Laws and Regulations, Dr. C. E. Cotton, Secretary Minnesota Live Stock Sanitary Board, St. Paul.

On July 1, 1919, the Federal Bureau of Animal Industry Regulation 7 will become effective. This regulation is to prevent the spread of tuberculosis in cattle and swine and control the interstate movement of all cattle. The tuberculin tests and health certificates of veterinarians in Minnesota whose competency and reliability are certified to by the Executive Officer of the Live Stock Sanitary Board, will be acceptable to the Bureau. The Bureau regulation for a proper tuberculin test and health certificate will be discussed and understood.

The last legislature passed a law relative to controlling and regulating the use of serum-virus treatment for hog cholera. The Live Stock Sanitary Board's interpretation of this law and rulings will be explained and a discussion invited.

After the program a smoker will be tendered the association by the Brainerd Chamber of Commerce.

THURSDAY.

Morning.

The work of the State Veterinary Examining Board, Mr. A. J. Tupa, Executive Secretary, St. Paul.

Case Reports; Sterility of Cattle, Dr. K. J. McKenzie, Northfield.

Retained Placenta, Dr. W. L. Boyd, University Farm.

Army Veterinary Service in France, Major D. B. Palmer, Minneapolis.

Afternoon.

An auto tour will be provided by the Brainerd Chamber of Commerce in order to visit some of the neighboring herds. On this trip Mr. W. A. McKerrow, Extension Live Stock Specialist, University Farm, will give a demonstration of the judging of live stock.

Adjournment.

On Wednesday evening a reception for the ladies is planned at the Ransford Hotel. A theater party for the ladies will be given at the Best Theater on Thursday afternoon.

Reservations for rooms should be made early, as a large crowd is expected. C. P. FITCH, Sec.-Treas.

TIPPECANOE (INDIANA) VETERINARY MEDICAL ASSOCIATION.

The most successful meeting ever held by the Tippecanoe Veterinary Medical Association took place June 5. Afternoon session at the Veterinary Building, Purdue University, where Dr. Cotton of the Bureau of Animal Industry, Washington, D. C., gave a splendid address on contagious abortion disease. A banquet was held at 6 o'clock at one of the local hotels in honor of the veterinarians who have returned from service. Dr. Roy B. Whitesell of Lafayette gave a resume of his experience on the battlefield. Dr. Whitesell was among the first veterinarians to go across after we entered the war.

Dr. R. F. Smith of Burrows also gave a brief review of his experience in France, Italy and a visit to Austria and Hungary after the armistice was signed. Dr. Smith had the pleasure of interviewing Drs. Hutyra and Marek while in Budapest. He was greatly impressed with the magnificent equipment of the Royal Veterinary College.

Following this, Professor G. L. Roberts of Purdue University, who was head of the educational reconstruction of the West Baden Hospital, gave a stereopticon lecture, pointing out the methods and systems adopted in fitting the unfortunate crippled soldiers to take up a new life work.

L. C. KIGIN,
Secretary and Treasurer.

NATIONAL ASSOCIATION OF BUREAU OF ANIMAL INDUSTRY VETERINARIANS.

Dr. J. A. Kiernan, chairman of our Committee on Legislation and Publicity, Washington, D. C., wired this office on the 4th inst. that the agricultural appropriation bill for the fiscal year beginning July 1, 1919, passed the House of Representatives on June 4, containing the Rainey amendment and the overtime pay provision as it passed the House in the sixty-fifth Congress, and that Congressman Rainey feels confident that the House action will be confirmed by the Senate.

The following is a copy of that section of the agricultural bill containing the above-mentioned legislation:

"MEAT INSPECTION, BUREAU OF ANIMAL INDUSTRY:

For additional expenses in carrying out the provisions of the meat-inspection act of June 30, 1906 (thirty-fourth statutes at large, page 674), there is hereby appropriated for the fiscal year ending June 30, 1920, the sum of $803,960; provided, that hereafter the Secretary of Agriculture is authorized, in his discretion, to pay employees of the Bureau of Animal Industry employed in establishments subject to the provisions of the meat-inspection act of June 30, 1906, for all overtime work performed at such establishments, at such rates as he may determine, and to accept from such establishments wherein such overtime work is performed reimbursement for any sums paid out by him for such overtime work."

This means that, if the House provision prevails in the Senate, funds will be available with which to grant basic (permanent)

salary increases of $120 each per annum to 2,932 employees in the meat inspection service who are now receiving basic salaries of $2,500 or less per annum. This increased appropriation will also permit of basic salary increases of $240 each per annum to 11 veterinary inspectors in the meat inspection division now receiving basic salaries in excess of $2,500 per annum.

The permanent salary increases that will be made possible through the Rainey amendment are in addition to the temporary bonus of $240 per annum provided for in Section 7 of the legislative, executive and judicial bill for the fiscal year 1920, which is quoted verbatim on pages 33 and 34 of the proceedings of our Philadelphia convention. You will note that those 11 veterinary inspectors who stand to receive a basic salary increase of $240 per annum through the Rainey funds are barred from any temporary salary increases through the legislative act.

It is my understanding that the agriculture bill for the fiscal year 1920, as passed by the House during the present Congress, also provides sufficient lump sum appropriations to permit veterinarians in branches of the Bureau service, other than meat inspection, to receive basic salary increases on about the same basis as herein specified for veterinarians in the meat inspection service.

S. J. Walkley, Secretary.

Dr. William E. White is in charge of the Bureau coöperative hog cholera work in the state of South Carolina, with headquarters at Columbia. He is associated with the State Veterinarian, Dr. R. O. Feeley, who is also an official in the State College of Agriculture.

Dr. Charles E. Schneider has been placed in charge of federal meat inspection at Albert Lea, Minn., vice Dr. George W. Knorr, resigned to engage in outside business.

Drs. Solon Gillen, A. C. Curtiss, Jay B. Current, Jay W. Reeder, William C. Storch and Frank J. Lingo have been added to the force of inspectors at Columbus, Ohio, engaged in the eradication of tuberculosis.

The Louisiana State Board of Veterinary Medical Examiners met in Baton Rouge, Wednesday, June 11, and examined six applicants for license to practice veterinary medicine in Louisiana.

COMMUNICATIONS.

STOCKYARDS AGAIN OPEN TO PUBLIC.

To the Editor:

We are of the opinion your readers will be interested in the following and for that reason are sending it to you for your news columns. ARMOUR & Co.

After being closed for two years, due to government restrictions prohibiting visitors from the stockyards because of the war, Armour & Co.'s huge plant in the Chicago stockyards is again open to visitors.

This announcement will prove of interest to not only people who intend to visit Chicago some time this summer but to many others as well because, the announcement says, "preparations are being made by Armour & Co. to open their other plants in various parts of the country so that a trip through a packing plant, which is an educational one, will not just be limited to Chicagoans or visitors to Chicago, but to people in fifteen different parts of the United States, where Armour & Co. have packing plants. Uniformed guides are in attendance to explain the various interesting things to be seen."

ANTHRAX AND SERUM.

To the Editor:

The approach of the anthrax or charbon season naturally brings to mind our experience of former years, and in this connection, I recall most vividly my experience in the use of anti-anthrax serum as a curative agent during the season of 1918. We were using the serum from two of the principal biological houses as a curative agent, with very flattering results, using from one to two hundred cubic centimetres intravenously as an initial dose and following this up with either intravenous or subcutaneous doses, as the case seemed to indicate.

Along about August the supply of serum ran out, and after two or three weeks' continuous telegraphing we at last procured a new supply. We immediately resumed our treatment, as the infection at that time was very prevalent, but with absolutely negative results; in fact, losing over ninety per cent of the cases treated with the second supply of serum. Now, the question arises, what was the cause of this sudden change.

We know that the bacillus of anthrax is a microörganism of varying virulence, as proven by the fact of the manufacture of No. 1 and No. 2 viruses. It stands to reason that if the Bacillus anthracis may be cultivated in the laboratory of two such distinct strengths as we have in our No. 1 and No. 2 vaccine, then the same condition may, and in all probability does, obtain in nature. The conditions under which these bacilli grow must necessarily govern their virulence.

The question is, was there a sudden change from a low virulence in the spring, when we were having ninety per cent recoveries with the use of anti-anthrax serum, to a very high virulence in the fall, when we were having a ninety per cent loss with the same treatment, or was there a diminution in the potency in the second lot of anti-anthrax serum. We would be pleased to have some one answer this inquiry. F. J. Douglass.

New Orleans, La.

ABOUT SECTION 7, CODE OF ETHICS.

Editor of the Journal:

Section 7, Article 19, of the by-laws of the Association, dealing with the Code of Ethics, is as follows: "It shall be deemed a violation of the Code of Ethics for any member of this Association to contract with or through the officers of any live stock insurance company for professional treatment of the members' stock so insured, but this rule shall not prevent any member from becoming an examiner of risks and acting in the capacity of an expert for same."

Come now the insurance companies with a contract amounting to an agreement in direct violation of the above code, but offering a fair and just remuneration for such services and demanding skillful and scientific work. If a large number of animals are insured this work will amount to considerable. On the other hand, if we refuse to sign up with them some non-member will get it, with the result that it will amount to a loss of a part of our routine practice. What are we to do? The question is this: Is this part of the code fair to the members? If it is, then please will some one state why? If it is not, then why let it stand? As yet we do not know to what magnitude the live stock insurance business may grow.

However, it is well to be prepared so that if it should meet with more or less universal favor with the stock raiser and prove

a practical economy to him that we may not have to relinquish a part of our legitimate income to some other man just because the Code of Ethics of the Association of which we have the honor of being members tells us that we must.

G. E. JORGENSON,
Assistant State Veterinarian.

Clermont, Iowa.

Marechal Petain Decorating Major G. R. Powell with Legion d'Honneur.

Veterinary Corps,
A. E. F.

Editor of the Journal:

I am sending you a little snapshot of something that may be of interest to the readers of the Journal.

The picture is of the famous French general, Marechal Petain, decorating Major G. R. Powell, V. C., Assistant Chief Veterinarian, A. E. F., with the Legion d'Honneur.

Major Powell hails from Cleveland, Ohio, and I believe is the first American veterinary officer to be decorated with the Legion of Honor and the only one to be personally decorated by the famous Petain.

Yours truly,

William D. Odou,
Captain, V. C.

A HIGH COMPLIMENT TO THE B. A. I. AND TO THE VETERINARY PROFESSION.

Washington, D. C., May 29, 1919.

Dear Doctor Mohler:

I understand that the Bureau of Animal Industry is thirty-five years old today. The progress that the Bureau has made since its establishment is little short of marvelous. It is now, without a doubt, the most effective organization of its kind in the world, and I think it deserves the congratulations of the whole nation for the achievements to its credit. We all wish the Bureau many, many happy returns of the day.

Sincerely yours,

(Signed) F. R. Harrison,
Assistant to the Secretary.

REGULATIONS FOR INSPECTION OF LIVE STOCK.

The regulations of the Secretary of Agriculture for the inspection and quarantine of horses, cattle, sheep, swine and other animals imported into the United States, issued under date of April 23, 1918, effective May 1, 1918, as amended, are hereby further amended by revoking regulation 39 thereof.

This amendment shall become and be effective on and after July 1, 1919.

Done in the District of Columbia this 17th day of May, 1919.

Witness my hand and the seal of the Department of Agriculture.

(Signed) D. F. Houston,
(Seal) Secretary of Agriculture.

MISCELLANEOUS.

VACCINATING STOCKER AND FEEDER HOGS TO PROTECT COUNTRY'S SWINE INDUSTRY.

In an effort to protect the swine industry of the country against the possibility of introducing sick hogs into well herds, and at the same time to permit the shipment from stockyards of stocker and feeder hogs, the United States Department of Agriculture conducts a system of vaccination against cholera as a part of its inspection service at the various stockyards centers.

More than 324,000 hogs were immunized for shipment as stockers and feeders from stockyards of 18 cities during the six months from July to December, 1918, inclusive. To accomplish this without spreading disease in the face of all the attendant dangers, required such close care that the wisdom of some phases of the inspection system may not have been always apparent to all concerned. A description of the conditions under which stockers and feeder cattle are inspected is contained in a statement recently issued by the Bureau of Animal Industry of the department.

With swine moving by carloads and trainloads from producing areas into public stockyards of the country, says the statement, the pens of such yards are inevitably infected with the common swine diseases, of which cholera is the most important. Owing to this condition Federal regulations formerly required the slaughter of swine received, but after the serum and virus treatment against hog cholera was standardized, the possibility of reshipping immature hogs for further feeding resulted in a modification of the rules. Under the plan now in force swine properly vaccinated and disinfected may be reshipped for any purpose, including breeding.

PURPOSE AND METHODS OF INSPECTION.

Immunizing hogs against cholera is a veterinary procedure, including the preventive-serum treatment, taking of temperatures, and observing the condition of the animal during the test period. Necessarily the official regulations are of technical character, and it has come to the attention of the Department of Agriculture that in some cases the rules have been misinterpreted

so as to make them appear responsible for fluctuations in the stock-hog market.

For the information of the public, the Bureau of Animal Industry outlines briefly the method of inspection:

All public stockyards are considered to be infected and swine are, therefore, exposed to the contagion from the time of their entry into the yards; consequently, it is important that they be immunized promptly after arrival at such yards to protect them against contracting the disease.

For that reason the department opposes the immunization of swine that have been so exposed for more than five days. Hogs, though they may not show physical symptoms of cholera, may in some instances be affected with the disease to such an extent that immunization will not protect them.

VALUE OF FIVE-DAY LIMIT.

If the five-day limit were not applied many animals in this condition might be shipped to the feed lots, which would result in serious financial loss to the buyer through a high percentage of mortality, besides creating a center of infection in that community.

It is not permissible to immunize swine for immediate shipment interstate if they show symptoms of contagious or infectious disease.

If a considerable percentage of the animals in a lot is found to have high temperatures, the possible presence of such disease is indicated, and the animals are not immunized or permitted to be shipped interstate. It is possible to have hogs with high temperatures as a result of conditions surrounding the shipment to market, in which case they will return to normal within a short time.

In these instances the owner is permitted to present the animals for reëxamination as frequently as desired within the five-day limit, and if, upon such reëxamination, they are found to be normal their immunization is supervised, and after they are disinfected a certificate covering their interstate movement is issued. This provision is for the purpose of affording the owner every opportunity consistent with safety to the swine industry to market his shipment in the most profitable way.

MUST PROTECT PURCHASERS.

The practice of shipping swine from one public stockyard to another before immunization is liable to reduce the protection

afforded very considerably, because of the uncertainty as to the length of time the animals have been exposed. To permit the interstate movement of such lots would afford insufficient protection to the purchasers who are not familiar with these various phases.

Department inspectors, therefore, have instructions not to supervise the immunization of such lots unless it can be shown conclusively that not more than five days have elapsed since the animals were first unloaded in a public stockyard.

The widespread interest in the feeder and stocker trade is shown by the fact that the great majority of feeder hogs were sold in small lots. The figures for the Kansas City stockyards, where more than 100,000 hogs were immunized under Federal supervision during the last half of 1918, show that those animals were sold in about 600 different consignments, an average of approximately about 166 head per lot.

Briefly, it will be observed that the entire plan is to protect the swine industry against the introduction of sick hogs or those of doubtful health into well herds. Under the Federal regulations no hogs are held a longer time than is necessary to give them a clean bill of health.—*Weekly News Letter.*

PROTECTION AFFORDED OKLAHOMA HOGS FROM UNQUALIFIED VETERINARIANS.

To the Editor:—The following item from the Dallas (Texas) News illustrates a principle familiar to every member of the medical profession:

"Oklahoma City, Okla., May 27.—Complaints are being received by J. A. Whitehurst, president of the State Board of Agriculture, from graduate veterinarians that provisions of the 1916 statute relative to vaccinating hogs for cholera place an unnecessary burden upon the veterinarians in requiring examination and bond before they can apply the simultaneous serum and virus vaccination. Mr. Whitehurst applied to the attorney general for an opinion in the matter, and the reply is that, however severe the burden may be, there is no way to relieve it, and that the provisions of the law must be complied with. Laymen, veterinarians, physicians and all are placed in the same category, says the opinion of the attorney general. They must pass a satisfactory examination at the hands of the veterinary depart-

ment of the A. & M. College and put up a bond of $1,000 to be approved by the Board of Agriculture.''

In this state, as well as in many others, the chiropractor and the Christian Scientist do business without leave. They practice on human beings, no matter how serious the ailment may be. The osteopaths have to take an examination in their own peculiar theories, though they are allowed to apply these extraordinary theories in the treatment of any disease, chronic or acute. But the poor veterinarian has to qualify professionally and in addition put up a thousand dollar bond before he is allowed to dose the swine! It is said that the most convulsive type of humor is sometimes born of tragedy.

S. H. LANDRUM,
Altus, Oklahoma.

Journ. Am. Med. Assn.

SUCCESSFUL MEETINGS OF INDIANA EXTENSION VETERINARIANS.

The second series of meetings for veterinarians in Indiana have been held in seven different sections of the state. Dr. W. E. Cotton, Assistant Superintendent of Experiment Station, Bethesda, Md., U. S. Department of Agriculture, Bureau of Animal Industry, gave a very interesting and instructive talk on contagious abortion disease at the various meetings. A lively discussion followed each address given by Dr. Cotton.

The attendance was unusually good, and the Indiana veterinarians feel deeply indebted to Dr. Cotton for the clear and concise way in which he presented his subject. The response to these meetings has been so gratifying that it is the intention of the extension department to continue to hold similar meetings from time to time in the future.

L. C. KIGIN,
Extension Veterinarian.

Dr. Fenner C. Smith, formerly of Ithaca, N. Y., is now located at Sherman, N. Y.

Dr. Don A. Boardman has moved from Springville, N. Y., to Rome, N. Y., where he is now practicing.

After a residence of some time in Omaha, Neb., Dr. Charles H. Walker has moved to Idaho Falls, Idaho.

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OF THE

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W. H. DALRYMPLE, Editor. BATON ROUGE, LA.

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ANÆSTHESIA IN VETERINARY PRACTICE.

Before this article appears in print, it is possible that a bill will have passed the British Parliament requiring the use of anæsthetics in veterinary practice in Great Britain.

In fact it seems a little strange that, ere this, such a law had not been in force over there, considering the greater age of the profession and the position it holds among the other so-called learned professions, notwithstanding the fact that some of our confreres in the "tight little island" seem to continue to deplore the lack of proper recognition by those in authority.

No doubt anæsthetics are being used much more generally by the profession than in former days, but there is still room for their wider application everywhere, and we know that their greater use in operations, where they are not now employed, would not only aid in the relief of unnecessary suffering in patients under surgical procedure, but raise the status of the profession in the eyes of, not so much the fanatic, if we will, but of sensibly-humane and right-thinking people; for we observe, from some of our British exchanges, that among the members of Parliament who discussed the bill referred to, and were in favor of

its passage, were men of broad vision with reference to such matters, were friends of the veterinary profession, and who seemed to be surprised that some such law had not already appeared on the statute books.

If such a law is thought necessary, in the cause of humanity, in another country, it is surely required in the various states of our own, when one considers the barbarities that are too often practiced under the guise of surgery.

True, many of our professional men practice anæsthesia, either local or general, when its employment is necessary, but there are still too many who do not; and there is the great army of licensed non-graduate men and empirics who probably rarely or never think of it. Doubtless there are difficulties in the way of the enforcement of such a measure in any country, and which might be said to be intensified in our own on account of peculiar conditions. However, the sooner the matter is agitated and brought before the minds of the profession and the stock-owning public in the various states, the sooner will relief come, and much unnecessary animal suffering prevented; remembering that one, if not the first, law of surgery is the relief of pain.

In the cause of humanity, therefore, we commend those of our British confreres who favor the passage of their Anæsthetics Bill, there being many of them no doubt, and we trust that we, in this country, may, ere long, be guided and benefited by their example by having some such humane law passed in each state, and enforced, so far as that is practicable.

SHALL WE PROFIT BY THE EXPERIENCES OF THE LATE WAR?

The trite saying that "it is an ill wind that blows nobody any good," may, we believe, be applied, in a measure at least, to conditions which we hope may result from the recent world conflict, costly as the struggle has been in both life and treasure. The splendid efforts which were put forth for the conservation of life, both human and animal, and the gratifying results obtained, is sure to have a most salutary effect on the practice of both human and veterinary medicine and surgery in the future; and the experiences gained on the battle fronts of Europe have afforded opportunity, as never before, which will doubtless be taken advantage of by both branches of the medical profession in the

peace times that are to follow, which the world, generally, will get the benefit of. Such progress as has been made in medicine and surgery, during the few years of conflict, could not have been thought of, much less accomplished, under ordinary peace conditions; and it is to be hoped that the advantages gained will not be lost sight of, but form a stimulus to greater effort in the future for the benefit of the profession, and for those who are dependent on it for the saving of animal life and the relief of animal suffering.

In addressing the General Surgical Meeting of the A. M. A., recently at Atlantic City, Dr. Ernest W. Hey Groves, of England, made the statement that—

"No subject reduced us to such despair in the early days of the war as fractures. I may equally say that in the latter days of the war perhaps no subject has been more satisfactorily dealt with. That improvement was due, not to the genius of any one man, or to the invention of any one apparatus, but simply to the principles of coöperation, continuity and team work."

If this was the case with the medical corps, we have no doubt that the same may be said with reference to the veterinary; not perhaps with regard to fractures, but certainly with wounds, and doubtless with other conditions, found obstinate at first, but which afterwards responded to treatment which experience, "coöperation and team work" found to be satisfactory. One would not expect to find anything else than coöperation and team work under military conditions in the field.

However, now that the war is over and the members of our American Veterinary Corps are returning to civil life and practice, the valuable lessons learned during the days of hostilities should not be forgotten, but carried into everyday practice, bearing in mind that the profession, generally, would be better off if a little more coöperation was indulged in by its members.

A further benefit we believe the profession will have gained as a result of the war will be the much closer international relationship which will accrue from the mixing together, and companionship, of members from the different countries engaged in the strife. This, of itself, is a condition very much to be desired, as it is somewhat rare to find representatives of the profession in different parts of the world who really know, and appreciate, each other's worth as professional men. The fraternization among members of the profession which the war has

afforded should go a long way to remove such misunderstanding, and bring about greater sympathy and true fraternalism.

Another beneficial result we believe will be that our Government will be brought to realize more fully the advantage of a trained Army Veterinary Corps, which they cannot fail to do if they will but familiarize themselves with what this branch of military service accomplished for the different countries, our own included, in the conservation of life and usefulness among the animals at the fighting fronts.

So that while all deplore the terrible catastrophe of the late struggle, now fortunately at an end, let us hope that the future may be the gainer, if only we will endeavor to profit by the experiences obtained during active hostilities, and will put them to useful service in the "piping times of peace."

SCIENTIFIC FEEDING.

To supply food in the right proportion to meet the various requirements of the animal, without a waste of food nutrients, constitutes scientific feeding. It is by carefully studying the composition of feeding stuffs, the proportion in which they are digested by different animals and under different conditions, and the requirements of animals for the various food nutrients when at rest, at work, giving milk, producing wool, mutton, beef, pork, etc., that the principles of feeding have been worked out. In applying these principles in practice the cost and special adaptations of different feeding stuffs must, of course, be taken into account.—*Weekly News Letter.*

Dr. Charles Thigpen is now located in Anniston, Ala.

Drs. E. B. Haskin and Elmer Lash of Jackson, Miss., have reported in person to the Chief of the Bureau, Washington, D. C., for duty in the tuberculosis division.

Dr. E. L. Reed has resigned his position as manager of the Hog Cholera department of H. K. Mulford & Co., and has accepted a position with the Florida State Live Stock Sanitary Board on hog cholera control and inspecting and testing hog cholera serum and virus at Chipley, where the only serum laboratory in Florida is located.

VIBRIONIC ABORTION.

By Sir S. Stockman,
Board of Agriculture, London, (Eng.).

This disease was first described by the writer working in collaboration with Sir John McFadyean for the Departmental Committee appointed by the Board of Agriculture and Fisheries of Great Britain to inquire into Epizoötic Abortion. A full official report of the investigation was published in 1913.[1]

The present article does not attempt to give a complete account of the investigation, which occupied a period of several years, but it is hoped that it may prove of interest to some of the writer's American colleagues from whom he has recently received inquiries regarding the causal micro-organism and the method of its cultivation in the laboratory. The subject, moreover, acquires a further interest owing to a recent publication by Dr. Theobald Smith.[2]

Species of Animal Susceptible to the Disease.

The disease was first discovered amongst ewes, and there is little doubt that this species is the most commonly affected in Great Britain; it appears also to be the most susceptible to experimental infection.

Only three outbreaks of the disease in cows have been met with in Great Britain amongst the many thousand outbreaks of abortion in cattle which have been inquired into. It would appear to be a disease of rare occurrence in cattle, though this may be open to another explanation, viz: that infected cows do not usually abort. Experimental infection in pregnant cows does not usually cause abortion, but a few positive results have been obtained. Positive results were also obtained experimentally in the goat and the guineapig.

Character and Symptoms of the Disease.

Vibrionic abortion assumes enzoötic characters, being confined to certain farms, and showing no great tendency to become epizoötic, as in the case of bovine abortion. Amongst sheep on in-

[1] Part III, Abortion in Sheep. Cd. 7156 and Appendix to Part III, Cd. 7157. Messrs. Wyman and Sons, Ltd., 28, Abingdon St., London, S. W., and Agencies of T. Fisher Unwin in the British Colonies and the United States of America. Price, sevenpence.

[2] Spirilla Associated with Disease of the Fœtal Membranes in Cattle. Jour. Exp. Med., XXVIII. 1918.

fected farms it may apparently disappear almost entirely for several years, and break out again periodically with appalling losses. It is still a question whether the infective agent during the years of latency persists on the pastures as a saprophyte, or in the organs of certain members of the old stock which act as carriers. (See Report.) The symptoms in ewes are primarily those of premature parturition, but some of the animals show a sanguineous, mucoid, discharge from the vulva days or even weeks before abortion occurs. In experimentally infected ewes this discharge sometimes appeared a few days after infection. Vibrios can be found in the discharge, but it does not always happen that actual abortion takes place, although vibrios may undoubtedly have invaded the uterus, caused a certain amount of catarrh, and passed through the os uteri with the discharge. When abortion takes place the fœtus is usually dead and putrid. Septic metritis is a not infrequent sequel. In the experimental animals the intervals between infection and abortion varied from 13 to 113 days, and it is probable that this also applies in practice. On the farm the usual history is that a few lambs were aborted in the early stages of the pregnant season, but the appalling losses appeared with almost dramatic suddenness about six weeks before normal lambing time. Forty to fifty per cent of the lambs may be lost.

Post Mortem Appearances.

Specific lesions are not found in organs other than the uterus, but the pelvic tissues may be hæmorrhagic owing to bruising caused by efforts to expel the fœtus. The uterus may be normal externally or it may show considerable œdema in the region of the neck. Internally the mucous membrane may show little alteration except a mucoid catarrh in the early stages. In later stages the membrane is congested and shows livid patches. Between the mucous membrane and the fœtal envelopes a variable amount of exudate is found, if the examination is made before abortion occurs. The exudate is usually watery in consistence, of a reddish colour and contains flockules of greyish mucus. From the surface of the cotyledons a milky juice can be squeezed out, and in this, as in the exudate, vibrios can be found. Some of the separated cotyledons may present a strikingly anæmic appearance, as in the case of bovine abortion. The fœtus may be well-formed and covered with wool, or it may be small, woolless, dark red in colour, and even pulped up in the membranes.

Even a well-developed fœtus may show a red œdematous fluid in the abdominal wall and peritoneal cavity, and vibrios may be found in the œdema and in the contents of the stomachs. If putrefaction has supervened the appearances are altered accordingly, and the stench is foul.

The Virulent Material and Its Dissemination.

The contents of the infected uterus, the fœtus, and its membranes, are virulent. The virulent material is spread about the pastures by infected ewes long before they show outward signs of going to abort.

Methods of Infection.

The disease can, of course, be conveyed experimentally by inoculation, but that is not a natural method. Experiments at the laboratory, however, showed that animals could also be infected by the natural passages, the alimentary tract, and vagina, particularly the former. One very practical experiment was carried out in this connection. Infected ewes were pastured in a clean grass paddock at the laboratory, and two of them at least were known to have discharged vibrios, 14 and 40 days before two other clean but pregnant ewes were moved in. These two ewes aborted 40 and 46 days after coming on to the paddock, and vibrios were found in the discharges and membranes, and in a fœtus.

Morphological and Staining Characters of the Vibrio.

When examination is made of preparations from natural material stained with fuchsin, methylene blue, or gentian violet, the vibrio is seen as single elements shaped like the letter S or a comma. There may be two or more joined end to end forming a spiral, but very long filaments are only found in old cultures. It is frequently noticed that a more densely staining area in the form of a round dot appears at one end of the comma-like elements. The vibrios are decolourised by Gram's method. In old cultures, especially in those which have been successful on the surface of solid media, there are very long filaments made up of comma-like elements, and it is by transverse division that multiplication seems to take place. In old cultures many of the vibrios have a granular appearance, and innumerable round granules are found free in the medium. These granules stain best by toluidin blue 1%. Viewed by dark ground illumination

the vibrios from a liquid culture are actively motile, and the comma-like elements can be seen shooting off from filaments.

Physical Requirements for Culture.

Under strictly anærobic conditions no growth is obtained. The vibrio, however, does not grow in a free supply of air; in the substance of solid media which has been liquified, sown, and then quickly cooled by placing the tubes in cold water, the growth appears below the surface. It will grow at room temperature, though slowly. The most suitable incubating temperature is 35°-37° C. Liquid cultures are destroyed by a temperature of 55°-57° C. maintained for ten minutes.

Filterability.

The granules pass through the Berkefeldt filter V, but no growth has been obtained from the filtrate.

Cultures.

Provided natural seed material be used, such as mucous exudate from the uterus or fluid from the fœtal stomach, it is easy to obtain a first growth on any of the ordinary media including peptone broth. As regards the solid media, however, this does not apply to smear preparations on the surface of sloped tubes.

Broth.

When sown with natural seed material and incubated at 37° C., growth is evident in from 24 to 48 hours. The natural exudate or tissue used for sowing seems to supply the necessary deoxygenater. On shaking up a tube the growth shows as a vibratory greyish cloudiness. Sub-cultures from broth tube to broth tube usually fail. If, however, a small portion of raw potato be added to the broth tubes and sterilized in the autoclave, a liquid medium is obtained in which cultures can be kept up in series. The writer has used this medium for many years for culturing bacteria, such as this vibrio and the bacillus of swine erysipelas, which seem to prefer an atmosphere slightly attenuated as regards oxygen. The potato seems to act like tissue in the now well known Tarozzi method, but in a less, and in this case more favourable degree.

The surest method of keeping up cultures in series is to sow with several drops of a liquid culture containing potato agar tubes which have been liquified and cooled to 45° C. They are then solidified by plunging into cold water. After ten days' in-

cubation when colonies are evident, a portion of the agar containing the growth is scooped out with a sterile platinum scoop, and transferred to a potato-broth tube. By alternating the medium every ten days in this way from liquid to solid and vice versa, the writer has had no difficulty in keeping his original cultures running for over ten years.

Agar.

Most frequently no growth occurs on the surface of slopes. When growth does take place it is in the form of a very thin grey film. If the agar be sown when liquid and then sloped or plated (not above 45° C.) innumerable brownish colonies like specks of bran appear just under the surface. If the agar be sown when liquid and then cooled quickly in the upright position growth takes place at first about one-third to one-quarter of an inch below the surface, and later it shows itself just below the surface, probably having made its attenuated atmosphere by absorbing oxygen. The growth in the deeper zone begins as a grey cloudy ring. After about a month many of the colonies are from a pin-point to a pin-head in size, the large ones having a reddish-brown colour. Sometimes large isolated red colonies appear deep down in the medium. Fairly good plate cultures may be obtained on agar which has been made by using potato-broth instead of meat broth. This medium is put up in flat bottles which are heavily sown on the surface with a liquid culture, and incubated in a rarefied atmosphere.

Gelatin.

If a liquid culture is richly sown on liquified gelatin which if afterward solidified, the growth is slow, as the medium cannot be kept solid at an incubating temperature. It begins to show as a greyish cloudiness in about ten days, and a ring is formed about half an inch below the surface. It does not extend upwards.

Blood Agar Slopes.

This is the best method of obtaining surface growths, but it is not always successful. Grown in this way, however, the vegetating power of a seemingly enfeebled strain often seems to have become reënforced when transferred to other media. On the surface of blood-agar the vibrio grows as a greyish film which often becomes fairly dense. It may also appear as round globular colonies of a grey colour. In old cultures on this medium some of the filaments attain an enormous length, and granules

are very abundant. To obtain a somewhat dense emulsion for purposes, such as the agglutination test, several liquid cultures (if in potato broth they should be first filtered through paper) should be centrifuged, and the deposit of vibrios diluted to the requisite degree.

Observations regarding the agglutinating value of the serum of infected animals on the vibrio were made, some of which are recorded in the Appendix to the Departmental Report. It would appear that specific agglutinations develop in the blood of affected animals, and that the test is a valuable aid to diagnosis. It is also valuable as a means of determining whether an animal has aborted from infection by the vibrio or by the bacillus of bovine abortion.

ABORTION DISEASE OF CATTLE.*

W. E. Cotton,
Bureau of Animal Industry Experiment Station, Bethesda, Md.

I am fortunate in being assigned a subject which I am sure will interest you, whose duty and privilege it is to help guard the great live stock industry of the country against loss through disease. The subject is of unusual interest at this time, because a world shortage of cattle and of most everything else makes the need for preventing waste probably greater than ever before.

With the exception of tuberculosis, infectious abortion probably causes greater losses to the cattle industry of this country than any other disease, and it is even a question whether tuberculosis can be excepted. Of all the great plagues that affect our cattle industry, it is perhaps the least understood. In the short time which we have, I shall try to discuss the more important known facts and their application to the control of the disease.

It is now generally conceded that the abortion bacillus of Bang is responsible for most of the abortions of a contagious nature. Other causes no doubt are at times responsible for abortions, but these probably play a minor part in the abortion question. In this connection it is well to mention the recent work of Dr. Theobald Smith (Journal of Experimental Medicine, Vol. XXVIII, No. 6).

Dr. Smith reports, that from 41 cases of abortion in a group of herds under one management with more or less intercourse be-

* A lecture delivered to the veterinarians of the State of Indiana through the Agricultural Extension Service of Purdue University.

tween herds, he recovered B. abortus from 27 and a spirillum from 14, and that in no instance were both organisms found in the same animal. He concludes that the organisms are mutually exclusive. He asserts that, like B. abortus, the spirillum requires reduced oxygen pressure for its growth, and that it seems to have the same characteristics as the vibrio of ovine abortion described by McFadyean and Stockman in 1913 (Report of Departmental Committee of the Board of Agriculture and Fisheries on Epizoötic Abortion, Part III, Abortion in Sheep), but that the question as to whether the two organisms are identical has not been answered.

Because of the publication of the above work, it may be interesting to record that Drs. Buck and Creech of the Bureau of Animal Industry, Division of Pathology, have informed me that in the year 1918, on the following days, January 5, March 11, and December 30, they isolated a spirillum or vibrio in pure cultures from the aborted fetuses of four cows. Abortion bacilli were found to be present in the uterine material of one of these cows and in the milk of another soon after they aborted. All of the cows reacted to agglutination tests for abortion disease, and two of them had acquired the reactions since the beginning of the pregnancy that was terminated by abortion. Drs. Buck and Creech do not claim that they have traced any real etiological relationship between the spirillum or vibrio and the abortions with which they were in some way associated; on the other hand, they believe that the exclusion of the abortion bacillus as a possible causative agent in the few cases investigated, did not appear to be justified. In Dr. Smith's article, no report of tests of the blood of the animals under observation is made, and what such tests might have revealed is questionable.

McFadyean and Stockman report that they were able with some difficulty to infect cattle with their vibrio of ovine abortion, and report two outbreaks of natural infection of cows with this organism. They suggest that cattle may be a factor in the epizoötiology of ovine abortion, and also make the following statement: "There seems to be little doubt that cattle can become infected with abortion, due to the vibrio, but there is a good deal of experimental evidence and field observation in favor of the view that infection by this microbe is rare."

Should Dr. Smith's spirillum prove to be identical with the English vibrio, and should it prove to be actually responsible for

the abortions that Dr. Smith reports, it would seem that it was a factor of much more importance in cattle abortion than the English investigators were led to believe. However, since all of Dr. Smith's cases were confined to a group of herds under one management, the figures given in his results can not be taken as indicative of the prevalence of this infection, even if the spirillum should prove to be a factor in causing abortions.

While abortions, even those of an infectious nature, are sometimes caused by other organisms than the Bang bacillus, I think I am safe in saying that could we by some magic destroy all of these bacilli in existence, our troubles from cattle abortion would for the most part disappear.

The abortion bacillus was discovered by Bang and Stribolt in 1897. The disease had been suspected of being of an infectious nature for a considerable time. Bang described the organism and its cultural characteristics, the principal one of which was its peculiar relation to oxygen, requiring a reduced oxygen pressure for its development. He also described the lesions found in the uterus, and reported that by introducing cultures of the organism into the vaginas of pregnant cows, he was able to produce abortion.

Not as much attention was paid to Bang's and Stribolt's discovery as it merited, and it was not until Bang in 1906 reannounced the discovery and reported the results of further work, in a paper before the National Veterinary Association at Liverpool, that investigation became active. Soon after this, their work was confirmed by several investigators, and McFadyean and Stockman in 1909, as members of a Departmental Committee appointed by the Board of Agriculture and Fisheries of Great Britain to inquire into epizoötic abortion, made extensive investigations, as a result of which they concluded that the bacillus of Bang was responsible for epizoötic abortion in Great Britain, but they were not able to confirm Bang's and Stribolt's findings as to the organism's relation to oxygen.

The Bang bacillus was not identified as the causal agent of abortion disease in America till 1910, when, according to Giltner, McNeal and Kerr published the first account of the isolation of the organism in this country.

The abortion bacillus is a short, non-motile, gram-negative rod, 1 to 2 μ. in length and about 0.5 μ in width, which stains readily with the ordinary anilin dyes. It grows slowly on ordi-

nary bouillon agar containing a small amount of bile or glucose and glycerine, but better on serum agar. A slight reduction in oxygen pressure seems to favor its growth. Bang seemed to think that reduced oxygen pressure was necessary for its growth, but other investigators have grown it in ordinary tubes sealed with paraffin, and even without sealing, if the tubes are prevented from drying out.

The abortion bacillus is killed by a temperature of 60° C., maintained for 15 minutes, but resists a temperature of 55° C., maintained for 20 minutes to three-quarters of an hour or more. It is therefore killed when present in milk by efficient pasteurization.

Cultures of the organism are able to remain alive for months. Mohler and Traum found bouillon cultures kept at room temperature for eight months to still be alive. While Holth kept cultures alive under similar conditions for nine months. Schroeder and I kept cultures in tubes sealed with paraffin in the incubator for over 900 days. In this case, however, there was slow multiplication and the test is not a measure of viability.

Bang found that the bacillus would remain alive in uterine exudate kept in the ice box for seven months. Holt obtained cultures from fetal material kept at 2° to 4° C. for eight months, and McFadyean and Stockman found that exudate contained living abortion germs after six to seven months, but that after a year they could find none.

The organism, when contained in uterine exudates and fetal material, withstands exposure to sun and weather to a remarkable degree. While McFadyean and Stockman found that exudate rich in abortion bacilli, artificially dried for three days, then powdered and kept for three months, was inert, they suggest that under natural conditions, exudate requires a long time to dry, because a hard crust forms on the outer layer and protects the inner mass. A small quantity may be quite moist after two months in the laboratory. In support of this, Schroeder and I found that uterine exudate exposed on the ground for 10 days in February, when the weather was warm for the season, was dried into a leather-like mass, but which still contained living abortion bacilli. We also exposed infected placentæ and fetal organs under fly screen in a wood from December 22, and found living abortion bacilli to be present at the end of January, or after 38 days, and also on May 5th, or after 135 days. During this time the material was more or less protected by fallen leaves.

It seems, therefore, from the evidence available, that the abortion bacillus has a fairly strong vitality, and while it does not bear spores, and so far as we know does not multiply under natural conditions outside of the animal body, its persistence and perpetuation are insured, in part, by its ability to remain alive outside the animal body for a long time. This fact is of great practical significance; because it shows that we cannot depend on natural agencies to destroy the organisms to the extent that we can in some other diseases. The products of abortion, the discharges which follow it, and the afterbirth and discharges following a normal birth from an infected cow, because, as will be shown later, they may also contain virulent bacilli, must be destroyed.

ANIMALS SUSCEPTIBLE.

While abortion may be experimentally induced in several species of animals, it is generally conceded that except in rare instances, cattle only suffer as a result of natural infection. It may be necessary to qualify this statement somewhat, since reports from the field indicate that sows, at least at times, acquire infection.

Good and Smith in 1916 reported the isolation of abortion bacilli from the afterbirth and fetuses of an aborting sow, and the experimental induction of abortions in sows by injection and feeding of such bacilli.

Dr. Connaway of the Missouri Station told me over a year ago that he and his assistant had found the blood of several sows, on farms where abortion disease was present among the cattle, to give positive reactions to the agglutination tests for B. abortus. Recently, Dr. Buck of the B. A. I., Division of Pathology, informed me that he has isolated B. abortus from the products of abortions from outbreaks of abortions among sows in Indiana, and that the blood of these sows gave positive reactions to the agglutination test for abortion disease. Should outbreaks of this kind prove to be common, abortion disease at once becomes of much greater economic importance than is even now generally believed.

LOCATION OF THE INFECTION IN THE ANIMAL, AND CHANNELS OF ELIMINATION.

The fetus, the fetal membranes, placenta and the discharges from the uterus at the time of abortion and for a time following

it contain the infection. Any discharges from the uterus shortly preceding abortion should, of course, also be regarded as dangerous. In the fetus, the bacilli seem to be most numerous in the stomach and intestines. They are also present in the liver, spleen and heart blood. The number of bacilli discharged at and following an abortion is enormous.

Infected cows also often discharge abortion bacilli from their uteruses at apparently normal parturitions.

The organisms disappear from the uterus within a few weeks, commonly not to exceed two or three, after an abortion or parturition. It persists a longer time if the afterbirth is retained than if the cow cleans properly. Its persistence is probably dependant to a considerable degree on the damage done to the uterus, and is shorter the more nearly the abortion approaches a normal parturition. The maximum length of time that Schroeder and I found the uterus infected after an abortion was 51 days.

Though we have searched repeatedly in the non-pregnant uterus for abortion bacilli, we have failed to find them except as noted above for a short time following an abortion or parturition. We thought that they might be eliminated from the uteri of infected cows at periods of œstrum, but we have failed to find this to be the case even though, as at the suggestion of Dr. Mohler, Chief of the Bureau, we gave cows large intravenous injections of abortion bacilli shortly before œstrum. Evidently the uterus is a favorable place for the development of the abortion only when it is actually functioning.

In addition to the genital tract, the udders of most infected cows, whether they abort or not, become infected in one or more quarters. The supra-mammary glands are also usually infected, and in one case Schroeder and I found that the infection had reached the lymph nodes at the brim of the pelvis. We have killed a number of infected cows and made careful search in their organs for abortion bacilli, but have found them only in the udder, the glands above mentioned, and in the pregnant uterus, never in the ovaries.*

The udder seems to be the only place in the non-pregnant cow where the bacilli can grow. It furnishes a culture field from which bacilli enter the blood stream, as is evidenced by the infection of the supra-mammary glands and those at the brim of

* Drs. Buck and Creech report having recovered abortion bacilli from a joint of an infected cow which showed lameness. Regions of reduced vitality may possibly become infected.

the pelvis. If the cow is non-pregnant, the bacilli, finding no favorable medium in which to grow, either perish or are returned to the udder; if, however, the cow is pregnant, the organism finds a favorable medium in the pregnant uterus where it can multiply. Bcause of this, we often have infected cows either aborting a second time or producing apparently normal calves but with infected placentæ.

The behavior of the abortion bacillus in its relation to the udder of infected cows is very curious. Nowhere else among bacterial diseases do we find a similar relation. The fact that a large proportion of infected cows harbor abortion bacilli in their udders for long periods is a unique phenomenon. True, with many bacterial diseases some cases become carriers, and in some, like the Typhoid Marys and Johns, remain carriers and disseminators for many years; but they may be regarded as accidental, and not essential to the perpetuation of the disease. The infection of the udder with the abortion bacillus, however, seems to play a definite part in the survival of the organism. In the diseases caused by protozoa, such as Texas fever, surra, malaria, etc., most recovered animals remain carriers for a considerable period, and this is necessary for the perpetuation of the organisms, because the infective agent is carried from animal to animal only by insects, which in some cases also act as true intermediary hosts in which the organisms undergo a stage of their development. With the ordinary bacterial diseases few carriers are necessary to secure their perpetuation, because the animals they attack are at all times more or less susceptible. Conversely, since carriers are so numerous and persistent in abortion disease, it seems likely that there are only short periods in the life of the animal when proper conditions exist for the implantation of the bacillus, and, we may assume, that evolution has provided the bacillus, to insure its perpetuation, with ability to maintain itself in the udder without endangering the life of its host. The bacillus is unique in seeming to require embryonic tissue for its active development, which is present in animals only during the relatively short periods of their existence. Growth in the udder may be likened to a resting stage of the bacillus, multiplication there is evidently slow and no resistent tissue changes seem to be induced in the organ. A sort of commensal relation seems to be established between the bacillus and the udder cells.

The above relationship seems to point to a critical time of infection in the cow, and that this is the period of gestation. Observations of Schroeder and myself lead us to believe that most infections probably occur after the cows become pregnant; and from then until the placenta ceases to be active. Just when the danger of infection is greatest we are not ready to say, but it seems reasonable to believe that it may not be till some time after conception, and is not until there is a sufficient culture field of embryonic tissue on which the bacilli can grow. As to the upper limit of infection we have some knowledge. We found that an intravenous injection of abortion bacilli made 11 days before parturition caused the infection of the placenta, and that an injection into the udder, 53 days before parturition, had the same result.

The udder may be infected in one or more quarters, and though the presence of the bacilli can not be determined every day, their elimination is fairly constant, and may persist for years. In one case under our observation, elimination continued 6½ years, and in many others for several years. The udder seems to be a reservoir from which the uterus can be reinfected, and from which a more or less constant stream of abortion bacilli flows to the outside world. In the case of the infected uterus, the discharged material is much more intensely infected, but, as a rule, it is discharged only during a short period, whereas in the case of the udder, the bacilli are quite likely to be given off more or less constantly as long as the cow is in milk.

A small percentage of bulls react to the complement-fixation and agglutination tests. This means that they either are or have been infected. The reactions are not as marked nor do they persist as long as in cows. This seems to indicate that the infectiton does not find so favorable a soil in which it can maintain itself as it does in the cow.

Schroeder and I made tests of the organs of four reacting bulls for the presence of abortion bacilli. The first of these bulls at one time reacted in a dilution above 1-200, but some time before he was killed the reaction had faded out. No abortion bacilli were found in his organs. The second bull which had reacted in a dilution of 1-400, but which had dropped to 1-200, on autopsy showed the presence of an abscess in one of its epididymides. We proved this to be infected with abortion bacilli, but were unable to find these bacilli in the seminal vesicles or any other

organs. In this case the passage to the seminal vesicles was probably blocked off.*

The third bull had reacted in a dilution of 1-800, but had declined to 1-400. No microscopic lesions were found, but we were able to recover the organisms from the lymph glands at the brim of the pelvis. The fourth bull, unlike the above three cases of natural infection, had been artificially infected by receiving a large intravenous injection of abortion bacilli. He was killed three weeks later. Abortion bacilli were recovered from the glands at the brim of the pelvis but from no other organs.

Our observations lead us to believe that bulls are not often infected, and the available evidence is not sufficient to incriminate the bull as a common disseminator of abortion disease. Even if their seminal fluid is infected, we are not certain that the cow served would become infected. True, it seems that she would, but we have some experimental evidence which indicates that this may not usually be the case. The three infected bulls recorded above served a considerable number of cows without infecting them, but, as the precise importance of the bull in his relation to abortion disease remains to be measured, we should take no unnecessary liberties with him of a kind which may lead to disaster such as promiscuous use, the exposure of uninfected cows to reacting bulls, etc.

METHOD OF INFECTION

While the channels of elimination are fairly well known, the exact modes of infection are a matter of discussion. Formerly much weight was attached to the soiling of the external genitals of the pregnant cow as a mode of infection. It was supposed that in some way the infection entered the vagina and finally reached the uterus. Bang, while admitting this possibility, attached more importance to the bull as a means of infecting the cow, "as that is," he said, "the only way in which direct introduction of the virus into the uterus can be effected."

It is quite natural to assume, when the infection of an organ which has a direct opening to the outside occurs, that the infecting agent enters directly through that opening. But this is not necessarily the case. In fact, it seems that evolution would have provided those openings with such defenses that direct infection

* Drs. Buck and Creech of the B. A. I., Division of Pathology, tell me that they have found the seminal vesicles of four bulls to be infected, and to show definite lesions.

would be difficult. In the case of pulmonary tuberculosis, the first and most natural thought was that the infection entered through the air passages, the most direct route, and it was a long time before the more circuitous, but possibly easier route via the digestive tract and blood stream, was seriously considered as an avenue of infection. Just so with abortion disease; the first thought was that infection occurred directly through the external opening of the genital tract, but now the evidence points to infection via the intestinal tract and blood stream as the more probable route.

It has been quite commonly believed that the bull, even though not infected himself, was a mechanical carrier; his penis becoming soiled with abortion bacilli from serving an infected cow, and he introducing the infection into the genital tract of the next cow that he served. While this seems very likely, we have very little evidence to show that it often happens. While Bang attached much importance to the bull as an agent of infection, McFadyean and Stockman, without denying that the disease may sometimes be spread by coitus, are of the opinion that nothing more than a subsidiary rôle in the spread of infectious abortion can be assigned to the bull. Hadley and Lothe were unable to infect heifers either by having them served by reacting bulls or by bulls that previously served reacting cows. Up to the present time, Schroeder and I have failed to infect cows through the agency of bulls, but we are not yet ready to say that it cannot be done. The evidence does not encourage the idea that the bull is an important factor in spreading the disease. The fact that in our observations reacting bulls did not transfer the disease to the cows they served, should not be used as a reason for excluding infected bulls as possible disseminators of the disease, because to prove that one method of contact between an infected bull and a cow does not transfer the abortion infection, throws no light on the harm a bull may do through now unknown and possible methods through which he may expel abortion bacilli from his body.*

It seems to be difficult to infect cows artificially via the vagina, and even when they are infected in this way, we are not certain

* Drs. Buck and Creech of the Division of Pathology of the Bureau of Animal Industry have isolated *B. abortus* from the enlarged testicle of a bull. The testicle showed marked lesions, and the attendant reported that the bull's seminal fluid was of abnormal appearance. It is quite likely that this bull had been discharging *B. abortus* with his seminal fluid. Even though such a bull may not infect cows directly through their genital tracts, and of this we are not certain, he might easily do so through the discharged seminal fluid contaminating food which susceptible cows may eat.

that the bacilli deposited on the mucosa are not absorbed and reach the placentæ through the blood stream rather than by direct passage through the os uterus. Schroeder and I have had little difficulty in infecting pregnant cows, by intravenous injection, by injection into the udder through the milk duct, or by feeding; but the few attempts that we have made to infect cows through the vagina, have failed. Non-pregnant cows are much more difficult to infect. Our observations indicate that the commonest mode of infection is by the ingestion of infected food and drink, and that the most susceptible period is that of gestation.

As stated above, we were able to infect a cow's placenta by injecting abortion bacilli into the udder through the milk duct. Therefore, this is a possible route of infection, but whether under the ordinary conditions of milking bacilli would enter the udder through the milk ducts we are not ready to say. We have an experiment in progress which we hope will throw some light on this point. We have, however, proved this much: that once the bacilli enter the udder of a pregnant cow, they may reach the uterus. We have yet to prove whether, under normal conditions, enough abortion bacilli can enter the udder to set up infection. At present, we can only say that the udder is a possible route of infection. As to the period from infection to the expulsion of the fetus, we can say little except that it varies. In all probability it depends both on the natural resistance of the cow and the intensity of infection.

SYMPTOMS.

Premonitory symptoms of infectious abortion are rare, and often pass without being observed. When present, they begin from a few hours to two or three days before expulsion of the fetus. One of the early symptoms is the sudden swelling of the udder, but this would not be noticed in cows in milk. Too much weight must not be given to a slight swelling of the udder, for this is apt to occur about the fifth or sixth month of pregnancy in healthy animals. Cows in milk may show a change in quantity and quality of the milk, the milk becoming more like colostrum. The animal becomes uneasy, its vulva is slightly swollen, and mucus, which may be blood-stained, is discharged from the vagina at intervals. This is followed by a yellow odorless discharge. These discharges soil the tail and may be sufficient to soil the floor behind the animal.

Abortion most commonly occurs between the fourth and seventh month of gestation, and occurs most often in the first and second pregnancies, though it may occur in any pregnancy. It may occur twice in the same animal, and rarely three or more times. If a cow aborts in the early months of gestation, the fetus and its membranes are expelled together and the uterus soon contracts. If the abortion occurs later, the afterbirth is apt to be retained. Some of the fetuses are born alive, but are weak, and usually die within one or two days.

Following an abortion there is usually a discharge, which may vary in character from a clear mucus containinig islands of chocolate-colored material to a dirty, yellowish-gray, muco-purulent substance. This discharge may continue for two or more weeks, dependent in a large measure on the degree of completeness with which the afterbirth is passed. If the afterbirth is retained for a considerable period, all the evils attendant on the retention of a putrifying mass within the uterus may result. But of course this is apart from the abortiton and would be likely to occur from retention of afterbirth from any cause. All retained placentæ should not be charged too hastily to the abortion bacillus.

It is common for cows that have aborted to require several services before the next conception takes place. At the Experiment Station we have had such cows that required six or more services before they conceived, and of 8 such cows, 5, or 62½ per cent, required an abnormal number of services for conception, and one failed to conceive at all. The second conception following an abortion usually requires only one or two services. Evidently considerable damage is done to the mucous membrane of the uterus by an abortion, and a varying length of time is required for its repair.

DIAGNOSIS.

By all means, if it is possible, use the agglutination or complement-fixation test to determine if infectious abortion exists in a herd. Both tests are reliable, but because of its simplicity the agglutination test is to be preferred. This test will show definitely whether the animal is or has been infected. It will not tell whether a cow will abort, because all infected cows do not abort. But it will point out the animals that are probably dangerous, in much the same way that tuberculin points out the animals that are or may become dangerous.

Schroeder and I have used the agglutination test for several years, and have found it to be as reliable as any biological test with which we are acquainted. None of these tests tell us whether or not a disease is going to terminate fatally. Abortion is the fatal termination of abortion disease. All cases of abortion disease do not terminate fatally. We have both weak and apparently normal infected calves born. These are cases that did not terminate fatally.

We have found reactions in infected cows to occur in dilutions of 1-100 to 1-3200, and in many instances found them to persist for long periods. We have reasons to believe that reactions will persist as long as abortion bacilli remain in the udder and for some time after, and that the reactions often persist at a high level for long periods. In no case have we found the milk to be infected unless the cow also reacted to the agglutination test.

The milk of reacting cows agglutinates abortion bacilli but in somewhat lower dilutions than the blood. Colostrum, however, agglutinates in much higher dilutions, sometimes as high as 1-25000; and in cows in which the reaction has disappeared from the blood, the colostrum will still show agglutinating power. The test of the colostrum is therefore much more delicate than that of the blood.

Calves of aborting cows often, but not always, react. The reactions, when they occur, are usually in approximately the same dilutions as those of their dams, and after a few weeks they fade away.

Regarding the reactions in calves, Schroeder and I have tentatively concluded that they are very apt to be associated with the presence of abortion bacilli in the placentæ. If further studies prove this to be true, it seems likely that the infected placenta is the source of the agglutinins in the calf, and that they do not pass preformed from the blood of the dam. This is reasonable, since it is in the placenta that the greatest changes seem to occur, and it is here that the greatest fight between the invading organisms and the tissue cells probably takes place. We do not wish this tentative conclusion to be accepted as a proved fact. The evidence we have is satisfactory in character, but not yet sufficiently abundant to establish a fact.

The reaction in calves, as far as has yet been determined, has no significance so far as the perpetuation of the disease is concerned. The reactions soon disappear, and we have every reason

to believe that when the calves reach maturity, unless reinfected from other sources, that they will be free from infection.*

Schroeder and I have found that blood will keep in sealed tubes for months, and that the suspension of abortion bacilli used for making the test will keep an equal or longer time. Therefore, the practicing veterinarian can draw the blood and send it to a laboratory to be tested, or if this can not be done, he can do the testing himself, as only simple apparatus is necessary.

The veterinarian who can make use of the agglutination test has it in his power to give to his clients information that may enable them to protect their herds against the introduction of infected animals, and to enable them to separate the probably dangerous from the probably safe animals in infected herds. In our opinion, no animal that reacts in a dilution even as low as 1-50 should be regarded as safe to be taken into a healthy herd.

It should be borne in mind, that when biologic tests of any kind are made, irrespective of whether they are agglutination, complement-fixation, or abortion tests for abortion disease, or tuberculin tests for tuberculosis, failure to obtain a reaction is not absolute evidence that the tested animals are free from infection unless an interval of time is known to have passed since their last exposure to infection.

If the agglutination test can not be made, the veterinarian must resort to a study of histories and symptoms in making a diagnosis. The history of the herd as to previous abortions and recent purchases of animals should be carefully inquired into, also the presence of abortions on nearby farms, sources of food supply, etc. If an abortion occurs, careful search should be made in the afterbirth and uterine exudate for the yellow or chocolate-colored masses, and the dirty yellowish discharge from the vagina which often, but not always, persists for some time. If microscopic examination of the fresh uterine exudate or of portions of the cotyledons reveals large numbers of small short bacilli, in clumps, they are apt to be abortion bacilli. Retained placenta, while it should arouse suspicion, is by no means evidence of the disease. An abortion occurring in a herd that has been free from the disease should be regarded as suspicious until it has been definitely determined that it is not infectious. To be sure, all abortions are not due to infection, but most are, and until one is certain that he is not dealing with infectious abortion he had

* Reactions in calves may be indicative of immunity.

best take the precautions that should be taken with animals affected with this disease.

PATHOLOGY.

In abortion disease no pathological changes that can be demonstrated seem to occur outside of the pregnant uterus. In this the changes seem to be mainly confined to the cotyledons and the fetal membranes. The fetus seems to die because its supply of nourishment and oxygen is interfered with, and does not present marked lesions, though sometimes a marked subcutaneous œdema is present. The cotyledons are congested, sometimes hemorrhagic, and usually show areas of necrosis, dirty yellowish in color. Though the udder is infected, no one has yet, so far as I know, demonstrated any changes in it.

TREATMENT.

Treatment of infected animals, up to the present time, has given very poor results. Extravagant claims have been made for carbolic acid, methylene blue and urotropine, administered internally. In some cases the number of abortions seemed to be reduced by the administration of these substances, but when the remedies were put to real tests, they failed. A good deal of false hope regarding these rememdies is due to the fact that abortion disease naturally tends to die out in herds into which no new animals are introduced. Abortions are very plentiful one year, the next year treatment is given and the number is much smaller. The remedy is at once given credit for the reduction, while if no treatment had been given the result would likely have been the same.

Bacterin treatment has been tried, but while its precise value has not been determined, it offers little hope.

The cow, after she has aborted, if she retains her placenta, requires treatment. But don't think that you can disinfect the uterus by the use of strong disinfectants without doing much damage to it. Most of the disinfectants do more harm to body cells than to bacteria. Remove the retained placenta by gentle mechanical means which do not injure live animal tissue. Flush out the uterus thoroughly with salt solution in order to remove the masses of necrotic material and exudate, and rely on the natural defensive powers of the tissues to destroy the remaining germs. Vigorous measures can be used to destroy abortion or other bacilli after they leave the animal body, but as long as

they are in contact with living body cells, it is far better to confine ourselves to the use of gentle means to remove them than to try to destroy them in situ, and in so doing weaken and destroy myriads of valuable body cells.

How can we hope to render the uterus, with its numerous crypts and glands, sterile by the application of a substance which kills the uterine cells more readily than bacteria, unless we dedestroy most if not all of its mucous membrane. If the process of sterilization is not complete, the living bacteria remaining find in the dead cells an excellent medium, contained in an excellent incubator kept at the proper temperature for their multiplication, and in addition more or less free from the restraining influence of the normal cells and their exudate, which is much reduced or absent because many of the living cells have been paralyzed or damaged by the disinfectant. Under such conditions a very few germs would become myriads in a very short time. The normal germicidal power of vital tissue and exudate is very considerable, but this will certainly be reduced or lost if the cells are damaged by strong chemical substances.

Modern war surgery has taught us the following lesson: Whenever a wounded and possibly infected surface is to be treated, our efforts should be directed to the removal of infection and all dead and devitalized material in which bacteria can grow by gentle means, and an avoidance of those measures which are supposed to kill bacteria without removing them or the dead tissue, etc.

PREVENTION AND ERADICATION.

We have much to encourage us in our efforts to control and eradicate abortion disease. While there are many unknown factors in the problem, there are several known ones, and these will aid in the discovery of more. We know the cause of the disease, many of the characteristics of the infective agent, and the sources from which it flows. We know that it is a definite, tangible thing which has no motion of its own, but must depend on outside forces to carry it to a new victim. We have discovered some of the agents that carry it from place to place, and can detect those animals, even though apparently healthy, which harbor the infection.. We also know at least one of the portals by which the infection enters an animal. It seems that with so many known factors we ought to be able to make some little progress in controlling the disease.

Let us first of all consider the precautions that promise to be effective in protecting the as yet uncontaminated herd. Though the disease is widespread, we are not justified in assuming that it is universal. Very many herds are undoubtedly still unaffected and the protection of them seems to be of first consideration.

In my judgment, the most likely agent to carry the infection into a new herd is the newly-purchased, infected, pregnant cow, that will abort or have a seemingly normal parturition, but with an infected placenta, some time after she has entered the herd. At this time she scatters a plentiful supply of infection about the stable, barnyard and pasture, where it is apt to soil the food or water of healthy susceptible animals. Or she may, if the bull is a factor in the transmission of the disease, infect him. Moreover, if the infection fails to become implanted in susceptible animals at this time, there are still chances in the future, because the infected cow is very likely to produce infected milk for years, and her placentæ and discharges at future parturitions may prove to be infected. She is therefore apt to be a more or less continuous spreader of relatively small amounts of infection, and at times may discharge large amounts of it. *We should always bear in mind that an apparently healthy cow may be a chronic carrier and disseminator of abortion bacilli.*

We can protect the healthy herd against animals of this kind, and also against infected bulls, by the use of the agglutination or complement-fixation tests. No bovine animal should be allowed to come into the herd unless its blood has first been subjected to one of these tests and proved to be negative. The test should be made after a period of several weeks' quarantine, because it takes some little time, just how much we do not know, for antibodies or agglutinins to develop in an animal's blood after the infection has gained entrance; therefore, an animal which showed no reaction at the time it was purchased, might show one a few weeks later, because, when the first test was made the animal may have been so recently infected that agglutinins and antibodies had not had time to develop. The above applies to biological tests in general, including the tuberculin test. Failure to obtain a reaction should not be regarded as absolute evidence that the tested animals are free from infection, unless an interval of time is known to have passed since the last exposure to infection.

Another possible source of infection is the supply of feed and forage, other than that produced on the farm. As has been pointed out, ingestion is one, if not the principal mode of infection. Feed or forage produced on a farm where infectious abortion exists may become soiled with discharges from aborting cows or with milk from infected cows; and since the abortion bacilli can withstand the action of natural destructive agents for a considerable time, one would be taking considerable risk in feeding such feed or forage to healthy cows.

Under this head we should consider another food product which is a greater menace than ordinary purchased grain and forage; this is unpasteurized separator milk returned from the public creamery. Such milk is one of the best agents for spreading disease germs, and especially abortion germs, which are so frequently found in the milk of cows infected with abortion disease. To be sure, the milk is not fed to cows, but nevertheless the germs are brought to the farm and the chances that some of them will reach the cows' feed is considerable. Furthermore, recent experience in your state indicates that under certain conditions hogs may become infected, at least by some strains of the abortion bacillus. A large share of separator milk is fed to hogs. Pasteurization or sterilization of milk makes it safe, and should be insisted on at all times.

The dog is another agent which brings abortion infection and many other infections to the farm. When we consider the dog's fondness for animal tissue, even if it is partly decomposed, and that he has a habit of carrying large pieces of such tissue home with him and burying it for a future meal, we can appreciate the damage he may do. We can readily imagine a dog visiting a barnyard or pasture in which an abortion had occurred and bringing a large amount of infection home with him, there to contaminate grass, feed or water given to susceptible cows.

With our present limited knowledge of abortion disease, it is not an easy matter to determine what is best to do with infected herds. Choice, however, may be made from three general methods of control:

1. Cleaning the herd by radical methods; using the agglutination test to determine the infected animals, and retesting to detect possible latent cases of infection.

2. Immunization by natural processes; keeping the losses down as much as possible by sanitation while the herd is becoming immune.

3. Artificial immunization acompanied by sanitation.

The first of these methods, where it can be economically practiced, ought to be the best; because, if it is sucessful, the herd soon becomes clean and free from carriers; and, after a proper safety period to allow possibly latent cases to develop to the extent that they can be detected by serological tests, animals could be safely transferred from it to other herds. The advantage of this will be especially appreciated by the breeder of pure-bred cattle.

To clean a herd by this method will require diligence on the part of the owner, and if the disease has become well established, may not be feasible except among animals of more than usual value. If, however, the disease has been only recently introduced, or only a few animals have become infected, it ought to be possible to clean the herd without great expense.

In carrying out this method, the herd should be tested by the agglutination test, all reacting animals at once eliminated, and all likely extra-animal sources of infection removed by a thorough cleaning of the premises. Retests of the herd should be made at short intervals (two or three months) until it is reasonably certain that no latent infection is present.

The disposition of the reacting animals is not an easy problem; many of them are perfectly serviceable and may never abort, but they are unsafe animals and should not be allowed to associate with healthy ones. We cannot be sure that they will be safe till they cease to react, which may be years in the future. Their offspring, however, if kept from their dams and other sources of infection after they are weaned, are free from the disease, so far as we know. Unless the reacting animals have unusual value, or can easily be isolated well away from the healthy herd, it is probably best to sell them for immediate slaughter.

The second method of treating the infected herd is based on observations made by many veterinarians and cattlemen to the effect that the disease tends to die out in a herd into which no new animals are introduced; the herd being kept up from its own offspring. The young animals reared in an infected environment seem to acquire immunity in some way.

Dr. J. P. Turner, now Major Turner, has had under his care a large dairy herd belonging to one of the public institutions in the District of Columbia. He reports that for many years the herd suffered much from abortions. New cows were constantly being brought in to replace those that became unprofitable. As long as this practice continued, abortion disease was very troublesome. The institution finally abandoned this method and used its own heifer calves to replenish the herd. Since this change was made there has been a great reduction in the number of abortions. Of course it remains to be seen whether this good record will continue, but evidences from other sources lead one to believe that it will.

This plan of control, while not requiring so much effort as the first one, has the disadvantage of being rather expensive when the losses due to abortions and their sequelæ are taken into account; and furthermore, the herd will have to be regarded as an infected one for a long time, possibly as long as the original animals remain in it.

The losses from abortions while the herd is acquiring immunity can, no doubt, be greatly reduced by protecting the non-reacting cows while they are pregnant, from the reacting ones that are pregnant or have recently aborted or given birth to calves, by removing them as far as possible from the infected environment. It is also desirable to prevent, as far as practicable, mass infection by the products of an abortion or an infected placenta or discharges coming in contact with the herd. Immunity to this disease is probably relative, and can be broken down by an excessive exposure. The point to be aimed at in this method of immunization should be to give non-pregnant animals repeated exposure to small amounts of infection.

In order to prevent mass infection, it is a good plan to provide a maternity stable to which cows showing evidences of approaching abortion or parturition can be moved, and where they can be kept until they have aborted or given birth to calves and all discharges from their uteri have ceased. If a cow then aborts, or gives birth to a calf with an infected placenta, the infected material will be in a confined place where it can be taken care of instead of being scattered among the herd. Such a stable need not be elaborate or expensive; in fact, the simpler the better, provided it gives the necessary protection to the animals and is so arranged that it can be easily cleaned and disin-

fected. It should contain a sufficient number of box stalls to accommodate the maximum number of cows that may become fresh at any one time. The stall partitions should be tight, in order to limit any infected material that the cow may pass, to her stall. The infected material can then be destroyed. After the cow has ceased to discharge, the stall, and better, the entire stable, should be thoroughly cleaned and disinfected.

The third method of control is that of artificially inducing immunity by the subcutaneous injections of living abortion bacilli about two months before conception. The method has been developed by McFadyean and Stockman in England. Their work, however, was based on that of Bang, who gave repeated injections of living abortion bacilli in increasing amounts, before the cows were bred. McFaydean and Stockman found that they could safely give a single massive injection of living bacilli about two months before conception, and acomplish about the same results as by the repeated injections of much smaller amounts. A large number of cattle in England have been treated by this method and the results seem to be promising. Since living bacilli are used, the method is recommended for infected herds only.

Immunization by this means is being tried in this country, but it is too early as yet to measure its value. It must still be regarded as in the experimental stage and must be used with care. In addition to its limitation to infected herds, it has the further objection that there is always the danger of making a carrier of the immunized cow through udder infection. This, however, may not be of serious moment, at least in herds in which no other attempt is made to control the disease, because most of the cows would likely become carriers anyway through natural infection. It is to be hoped that this method of immunization will soon be improved, or an entirely new one developed that will make it possible to certainly, safely and cheaply immunize; for such an agent would be of incalculable value in controlling abortion disease. In measuring the value of an immunizing agent against this disease, it is well to remember a suggestion made by Dr. W. L. Williams, to the effect that all factors concerning the output of the herd must be taken into consideration, and not the abortions alone. In other words, we must be sure that reductions in abortions are not gained at the expense of the breeding and milk-producing efficiency of the herd. It is also well to bear in

mind that while the animal's body probably has the machinery for immunization, it is a very intricate and delicate mechanism, and if we do not know its parts and the laws which govern their operation, we may do considerable damage if we carelessly attempt to set the machinery in motion. With our present knowledge, we should feel our way carefully till we get more light, lest we do damage in tampering with a delicate yet powerful piece of machinery. Even where artificial immunization is practiced, it is highly desirable that exposure of pregnant cows to massive infection be prevented as much as practicable, and that other sanitary measures be adopted.

Regarding the bull, though the evidence does not prove him an important factor in the spread of infectious abortion, it would be far from a safe policy to ignore the danger that may come through him. If the herd is free from disease, he certainly should not be allowed to serve outside cows unless it is known that they are from clean herds. Neither should an outside bull be permitted to serve cows in the herd unless it is known that he comes from a clean herd. If, on an infected farm, a single bull must be used to serve both abortion-free and infected cows, he should not be permitted to serve an infected cow until at least two months have elapsed after she aborted or gave birth to a calf. The service should take place on neutral ground, and he should not be permitted to serve a healthy cow for a few days after.

All infected material, such as placentæ, fetuses and uterine discharges should be burned or buried at once, and not permitted to lie about where it can be carried on the feet of persons or animals, or by hogs, dogs or rats, to places where it may infect cattle.

In disinfecting stables which become infected, the one fact that should be borne in mind above all others is, that to be effective, the disinfectant must come into actual contact with the germs to be killed. It can not do this if the germs are covered with a thick layer of dirt or manure. Thorough cleaning without disinfection is very apt to be more effective in preventing the spread of disease than disinfection without cleaning. As an agent for the disinfection of stables, the Experiment Station of the Bureau of Animal Industry uses a 1-700 bichloride of mercury solution. This has always been found to be effective, but of course there are many other agents possibly equally as good.

The disinfection of the external genitals and the douching of the vaginas of cows as measures to prevent infection has many advocates, but it seems to me, that besides being useless, work of this kind is more apt to do harm than good, and that it is far better to leave the protection of the vestibule and entrance to the uterus to unhampered natural agencies.

Some investigators advocate that extreme measures be taken to protect the calf from infection, but Schroeder and I are led to believe from our observations that this is not necessary. We have allowed calves to remain with their infected dams, and have placed calves from infected cows on uninfected cows, and vice versa, but up to the present we have not succeeded in infecting any of them. However, we have had a limited number of animals under observation, and for too short a time for our results to be conclusive. But it certainly is very difficult to infect young calves to a degree which makes it possible to determine that they are infected. A calf that reacts to the agglutination test at birth will, within a few weeks, cease to react, even though it is in the meantime consuming its mother's milk which may be highly infected. In no case has the calf of a normal cow nursed by an infected cow given a reaction. It is even possible that the consumption of infected milk by calves may produce a certain amount of immunity, and this idea is in harmony with the gradual development of herd immunity in herds into which no new animals are introduced. It seems from our present knowledge that it is fairly safe to allow the calves to remain with their dams till weaning time, or even till the end of the first year of life.

It is well to remember that it is not many years ago that the Texas fever, tuberculosis and hog cholera problems were as mystifying as that of abortion disease is today. We now know enough about the first of these to completely drive it from the land, and this is actually being done so rapidly that the end is not many years off. Our knowledge of the second is certainly sufficient to control the disease, and likely also to eradicate it completely. It is only a matter of making use of the knowledge we have. I do not mean by this that tuberculosis will cease to be a factor in our animal industry within the immediate future, for its control and eradication is a stupendous task and is going to take time, but I do believe that we will eventually succeed even with our present knowledge. Of hog cholera, as you well know, while our knowledge is not complete, nevertheless great losses

are being prevented by making use of the facts that have been discovered. Formerly the veterinarian was at a loss to know what to do or to advise when he was forced to undertake the abortion problem. I feel that the time of this state of helplessness is passing, and that already there is much actual service that the veterinarian can render towards reducing the losses from abortion disease, and as time goes and our knowledge becomes more perfect, he can render more and more. He is rendering splendid service in combating the other three great plagues which affect the animal industry, and I am sure that he will give the same kind of service in this. He need have no fear that he will work himself out of a job, for of work in the realm of veterinary medicine, as in every other field, there is no end if we but look for it.

In closing I would like to emphasize the following:

1. Most cows that are infected with abortion disease become and remain carriers and eliminators of infection through their udders for long periods.

2. The placentæ of infected cows at what seem to be normal parturitions may be infected.

3. The most probable route of infection is the digestive tract.

4. The most susceptible period seems to be that of gestation.

5. The greatest source of infection is the aborting cow at and following an abortion.

6. Though the evidence points to the bull as playing only a minor part in disseminating this disease, it is not safe to take liberties with him.

7. Calves seem to be insusceptible, and the progeny of infected cows usually remain free from infection unless exposed to it after they are a year old.

8. Do not try to kill abortion or other bacilli when in contact with delicate animal tissue by the use of strong disinfectants.

9. The agglutination test will detect infected animals except those too recently infected to have developed a reaction. It is an excellent test but is not prophetic nor perfect. It will not tell whether an animal will abort, but will tell whether she is apt to be dangerous.

10. The veterinarian can do at least three things in helping to control abortion disease. They are as follows:

(*a*) He can make an accurate diagnosis. Means are now at hand by which infected animals may be detected.

(*b*) He can give advice as to means of protecting healthy herds, of reducing losses in infected herds, and possibly cleaning up such herds.

(*c*) He can give rational treatment to the uteri of cows following abortions and to the uteri of infected cows following parturitions in which the placentæ are retained. It is important that the injured uterus be gotten back into as nearly normal condition as possible at an early date, because it is quite likely that this will have much to do with the cow's next conception both as to the promptness with which conception takes place and as to whether it will be followed by a normal birth. Also, the length of time that abortion bacilli will continue to be discharged from the uterus probably depends, to a great extent, on the rapidity of repair of the lesions in the uterus.

VETERINARY TRAINING PREPARATORY FOR THE ARMY.*

P. A. Fish, Chairman.

The European war has disturbed the equilibrium of the world to the extent that many lines of activity will never again return to the precise conditions existing before the war. Readjustment, even in unexpected quarters, will be necessary in order to meet the demands of the future. In educational, as well as other affairs, this must occur. In general subjects to some extent, in professional and technical subjects to a greater extent, there must be pruning and elimination of the non-essentials and development along lines which, properly coördinated and directed, represent efficiency and practical utility.

The best insurance against trouble is preparedness. The best reason for the existence of an educational institution is its usefulness. The more necessary it becomes in the utilities of the public, the stronger it stands as a necessity with a correspondingly decreased danger of failure.

* At the Semi-Centennial Celebration of Cornell University, conferences were held in the different colleges. In the Veterinary College Conference, there was an extended program consisting of reports by committees of the alumni on the various ways by which its work could be improved. Among these reports was one on "Veterinary Training Preparatory for the Army," presented by a committee of which Major P. A. Fish was chairman. Lt. Col. R. J. Stanclift, Major R. J. Foster, Major A. L. Mason and Capt. W. E. Muldoon were the other members. This was sent to the Editor by the Dean of the College, who states in his letter: "This report contains so much of interest that I feel it will be quite as helpful to the faculties of other veterinary colleges as it has been to us. As it deals, for the greater part, with the subject generally, rather than with specific reference to our college, I am sending it to you for publication in the Journal in order that all of the veterinary colleges may have the advantage of the suggestions made by the committee."—Editor.

The first Veterinary School, established at Lyons, France, 1762, was because of war conditions. The great loss of horses in the wars preceding that date caused such a drain upon the resources of the countries involved that the necessity for adequate knowledge, in the care of injuries and the treatment of disease, for the conservation of these animals became of the utmost importance. The first great impetus for veterinary education, therefore, came through war and its depleting effect upon live stock. In the course of time, with increased ravages from epizoötics among the other domesticated animals, the establishment of a veterinary school was more than vindicated. Other veterinary schools were established in quite rapid succession in other countries as well as France. Although the military side of veterinary education gradually subsided in most of the schools, it was maintained and, in later years, perhaps, intensified in the Germanic countries. It is well to remember the original demand for veterinary education, and, profiting from recent experience, realize that the present-day veterinary curriculum can, without radical change, be rounded out to serve adequately the needs of both army and civil veterinarians.

In the past there has been little or no attempt on the part of the veterinary schools to arrange the curriculum to the needs of the veterinarian entering military service. This has doubtless been due to the fact that there has been little demand for it. Until after the outbreak of the European war, the veterinarian in the U. S. Army held an anomalous position. Charged with responsibility for the health of the Army animals, he was without rank or authority, without adequate assistance and with no system of records. Under such conditions the highest results could not be expected, nor very much inducement offered for young men to enter the service.

With the participation of the United States in the war and with the incorporation of the veterinary branch in the Medical Department with the long-sought-for rank, a more attractive field has been opened. For an officer, the Army seeks a man well educated in general subjects, as well as the more technical one of the profession for which he has prepared himself. This is natural and necessary if he is to associate with officers in other branches and is to be a real leader of men, with proper responsibility for material placed in his care.

With the changed status as to rank and a more comprehensive, as well as a more detailed, knowledge of the problems gained from the experience of the war, it may be expected that more young men will be inclined toward army veterinary service. The progressive veterinary college, desirous of serving the state and nation, should, to meet this demand, scrutinize carefully its curriculum and adjust it in such a way that the basic needs of any veterinarian shall be maintained and yet afford opportunity for features of special benefit for those desiring to enter army service. In a general way, it may be questioned if a course of instruction designed for the veterinarian entering military service would not be of just as much value for a veterinarian entering civil practice.

In many instances certain of the courses already given need only slight modification; other courses should be extended, and in some cases a relatively few new courses may be required.

Since he is to become a part of the military organization, it should be obvious that the Army veterinarian should have some knowledge of fundamental military affairs which, at first glance, appear to be wholly isolated but later may be found to have a real value in coördinating his professional knowledge with his military environment.

In the case of some veterinary schools associated with universities, military drill is already a part of the curriculum. In addition to the drill, which is important, a course of lectures on military science in the university, dealing with basic principles, should be attended by the veterinary students, for the student should realize that he is preparing himself for the duties of an officer as well as a veterinarian.

One of the factors of military training which has received much favorable comment has been the transformation in the physical bearing and efficiency of the young men after experience in the service. Indifference, neglect of details, even slouchiness, has been evident in many who possessed collegiate training. Although ignored in the college curriculum, morale is a factor which should receive consideration as a fundamental principle, especially in the case of young men planning to enter the Army. Each department in a professional school has a certain responsibility, and by its methods of administration, attention to details and efficiency, can do much to develop in the student such quali-

ties of neatness, orderliness and system as will reflexly influence his later career and expedite his progress in the service.

A brief outline of the duties of Army veterinary service may be considered, as follows:

1. The care of all sick animals in a given command, including not only their professional care, but the operation of veterinary hospitals, the preparation and preservation of records, and the administration of the veterinary detachment.

2. Veterinary hygiene and sanitation, dealing with the health and efficiency of animals, including the control of communicable diseases. Except where given as separate courses, such a course might comprise the sanitary inspection of stables, corrals, picket lines, forage and bedding, methods of feeding, watering, grooming, shoeing, improvised stabling, correction of sanitary defects, detection and segregation of communicable diseases, mallein testing, and suitable recommendations for the establishment of quarantine.

3. Meat and Dairy Inspection:

(*a*) Inspection for soundness of meat at the time of receipt, while in storage and at issue.

(*b*) Inspection for compliance with Government specifications on receipt.

(*c*) Inspection of Quartermaster storehouses and refrigerators and the methods of operating and handling of food therein.

(*d*) Inspection of abattoirs, slaughter houses, butcher shops, branch storehouses and packing houses, handling meats which may be sold to troops direct or through the Supply Officer.

(*e*) Ante-mortem and post-mortem inspection for soundness and suitability of animals slaughtered for human consumption.

(*f*) Inspection of dairies and milk cows and dairy products.

4. Laboratory Service:

(*a*) Laboratory diagnosis.

(*b*) Preparation of biologics, including mallein and tuberculin.

(*c*) Laboratory diagnostic tests for glanders.

5. The special duties of an Army veterinarian: The purchase, mobilization and transportation of animals, as well as the evacuation of disabled animals and their care during evacuation in order that they may not encumber troops.

Considering the curriculum in its relation to the preceding outline, the course in anatomy should devote sufficient attention

to the surgical anatomy of the horse. It should also give instruction on the location of the principal lymphatic glands of all the food-producing animals.

The professional care and treatment of sick animals may be considered as adequately provided for by the regular courses in medicine, surgery, materia medica and therapeutics, with special attention devoted to communicable diseases. Clinical practice should insist upon the necessity of keeping careful and correct records of all cases. In the Army increasing attention is being devoted to the importance of military records.

In the course on Feeds and Feeding, not only the balanced ration, food values and the formulation of rations should be considered, but also inspection of forage and grain, with proper attention to concentrates and roughage from a military standpoint. A veterinary officer is frequently called upon to pass expert opinion upon the kind, quality and feeding value of forage and grain. In addition to his knowledge of this material native to our own country, he will in many cases find it advantageous to possess information relative to the forage of our insular possessions and even of some foreign countries. Qualification as a forage inspector is important, and deficiency in this respect is by no means infrequent. Ability in this direction is perhaps quite as essential as passinig judgment on meats and meat products or in judging animals for soundness. The consideration of poisonous plants may well be taken up in connection with forage or as a part of the course in materia medica.

In the course in Breeds and Breeding, in addition to the proper care of the stallion, mare and foal, attention should be paid to the types fitted for cavalry, artillery and heavy artillery work. In conjunction with this course, or as a separate course, there should be instruction in judging and examination for soundness and determination of the type of work for which the animal is best fitted.

Unless supplemented by separate courses, the instruction in veterinary hygiene and sanitation should cover the location and construction of veterinary hospitals and stables with respect to drainage and ventilation; stable management; methods of feeding, watering and grooming; inspection of bedding and of corrals and picket lines. Certain general principles should receive universal acceptance. The advisory service of veterinarians is of little value if there is disagreement upon fundamentals.

The course in horse-shoeing is very important, and special attention should be given to pathological conditions affecting the foot. As a rule, a large percentage of animals are rendered non-effective because of foot trouble, due primarily to shoeing.

In army service especially a veterinarian should be well qualified in horsemanship. The veterinary training camps have demonstrated that a rather large percentage of recent graduates have been deficient in this important matter. Practical training along this line is urgently needed, and the veterinary college should offer opportunity to the student to become thoroughly familiar with all that pertains to the use of the horse, including harness, bits, and saddles, driving and work with the rope, making rope halters, tying, etc.

A course in equitation, considered in a restricted sense as limited principally to riding, is perhaps of doubtful utility in the college curriculum, because on the one hand the facilities in this regard may be lacking or inadequate, and because, unless the course is under the direction of one familiar with Army technique and methods, the student may be obliged to unlearn much of the instruction given him when later he comes in actual contact with the methods of the service. Postponement of this work until practical and correct procedure can be developed, after entering the Army, is probably the more advantageous plan for all concerned.

The course in meat and dairy inspection should be supplemented so far as possible by practical demonstrations at the abattoir, with due consideration for ante and post-mortem examinations. The milk and dairy inspection should include practical instruction and work in stable sanitation; tuberculin testing; the production of milk, its care, shipping and conversion into dairy products. Matters pertaining to Government specifications and applicable to Government conditions may, perhaps, be taken up more advantageously after entering the service.

Laboratory practice: A laboratory supplied with proper equipment should encounter little difficulty in furnishing adequate, practical instruction in laboratory diagnosis, with due attention to the production of mallein and diagnostic tests for glanders.

The subjects referred to under group 5, relative to the duties of an Army veterinarian, the purchase of animals, mobilization and transportation, etc., can best be presented by one who has

had military experience. Other topics, bearing on details of a character special to Army service sufficient to cover a course extending over a few weeks, could be included in this group. Lantern slides may be arranged to illustrate some of these special features and this course be made obligatory for those contemplating Army service. For the presentation of such a course, it might be possible that an Army veterinarian could be detailed for the purpose.

A course in Military History should also be of interest. Although data relative to the recent war will be available, there doubtless is also existing much information of value relative to the Civil War, Spanish-American War, and experience on the Mexican border, which, if not collected and properly arranged will be entirely lost for future use.

It has been the aim to outline the subjects which it is believed will benefit and especially equip the young veterinarian so that upon entering the Army there will be a minimum loss of momentum and a speedy development of efficiency along the lines peculiar to the service. No attempt has been made to outline courses in minute detail, as the facilities, equipment and environment of the college should develop these details according to the best judgment of the faculty. In the event of the establishment of a veterinary school in connection with the Army Medical School for the training of young officers, it is believed that the curriculum as outlined will nevertheless be of much value. If such a training school is not established, the need for such a curriculum is even more manifest.

As applied to the curriculum of the New York State Veterinary College at Ithaca, N. Y., it is noted that the department of Anatomy already offers a course in surgical anatomy. If not already included in other courses, special attention should be given to the location of the lymphatic glands in the food-producing animals.

The professional care and treatment of sick and injured animals are adequately provided for in the courses arranged for that purpose.

In the courses in feeding and breeding it is recommended that they include or be sufficiently extended to cover the military view of the subjects as mentioned on page 532.

The course in Hygiene as now given for a period of only one hour per week for one term, dealing with the general principles of the subject, seems inadequate. To the Army veterinarian this

is a major subject, and the course should be enlarged to include those features which are of special value from a military standpoint. In this connection it should be noted that if the proposed battery of artillery is established at Cornell, it will offer an excellent opportunity for experience in stable management, sanitation, etc., of much practical benefit to the students, if suitable arrangements can be made.

The course in horseshoeing is very important and, as now given, is probably adequate if sufficient attention is given to its relation to the pathological conditions of the foot.

Although a course in judging, or animal mechanics, is not listed in the curriculum, such a course is available in the College of Agriculture. If this course can be modified to include a consideration of types suitable for Army purposes, including examinations for soundness, it should be included as a required subject in the veterinary course.

As already pointed out, the subject of horsemanship is of primary importance to a veterinarian whether he enters the Army or not. While some of the details, properly included under this term may be scattered through some other courses, it is a question well worth considering if matters pertaining to this subject should not be arranged in an orderly and systematic way and presented as a separate course.

Like the course in Hygiene, the subject of Meat and Dairy Inspection is of major importance to the Army veterinarian. The time alotted to it seems insufficient, in view of the responsibility placed upon the veterinary officer. It is recognized, however, that after entering the service opportunity is given for further preparation in this work, especially in connection with Government specifications.

Laboratory Practice: As for laboratory diagnosis, biologic products, production of mallein and tuberculin and the technique associated with their use, it is believed that the equipment, facilities and methods of the college are more than adequate for the requirements of an Army veterinarian.

As previously mentioned, the subjects in group 5 relative to the duties of an Army veterinarian, embracing features which are peculiar to military service, can be presented to the best advantage only by one who has had rather extensive experience in the service. Amplified by the use of lantern slides and possibly by some practical demonstrations, such a special course would be of exceeding value. With a competent Army Veterinarian de-

tailed to conduct the course, it is entirely practicable, and it is recommended that an effort be made to put it into effect.

For the prestige of the veterinary profession, the good of the service, and for the benefit of the officer himself, the Army Veterinarian should be an authority in his field, highly qualified on all matters pertaining to the Army animals. To this end, and for this purpose, the veterinary college should lend its earnest effort.

LT. COL. R. J. STANCLIFT.
MAJ. R. J. FOSTER.
MAJ. A. L. MASON.
CAPT. W. E. MULDOON.
MAJ. P. A. FISH, *Chairman*.

A CHRONIC POX-LIKE INFECTION IN GOATS AND ITS SUCCESSFUL TREATMENT.*

R. V. STONE and C. W. FISHER.†

In these days when food animals are so important, it behooves us as veterinarians to do what we can in the line of conservation of such animals. The goat is coming into importance so rapidly in this and other countries that some of us are often called to treat or advise in the care of this animal. It is hardly necessary to mention the fact that the goat will solve the sanitary milk supply problem for many families as well as furnishing a milk more nourishing and more easily digested than any other.

Of the ordinary ailments of the goat the veterinarian should readily understand them after a little thought. One disease, however, appears to be quite prevalent in this state and offers a problem not easily solved when first seen. The authors of this paper believe that it will become of economic importance to the goat industry, inasmuch as the persistent character of the disease causes a marked decrease in milk production as well as a great loss in flesh of animals affected. It is the result of meeting this condition in the field that has led to the work we are about to describe. It is our hope that in presenting this we may benefit to some extent the suffering goats and the perplexed veterinarians who may at some time confront this disease.

* Read by R. V. Stone before the California State Veterinary Medical Association and Southern Auxiliary at Fresno, June 2 and 3, 1919.

† C. W. Fisher, a practitioner of San Mateo, California, conducted the field work, and R. V. Stone of the Cutter Laboratory conducted the bacteriological examination and preparation of Bacterins.

It was in the early spring of 1917 that an outbreak in a herd of goats was brought to our attention, and subsequent developments resulted in an extensive amount of work for both Dr. Fisher and myself. We very soon concluded that it would be of interest to determine, if possible, the contributing factor to the persistent type of infection we found existed.

CASE REPORTS.

Case No. 5922, a 4-year-old, kidded Jan. 26, 1917, at 142 days. Three buck kids all lived, but were not very strong. Although the birth was plainly premature, she seemed not to suffer and had at first a normal flow of milk. About two weeks after kidding, she became stiff in her joints, loss of appetite, loss of milk flow, coat rough, staring, and eyes sunken. No eruptions appeared on the skin, however. On March 19th a large swelling on the sternum was noticed and it was lanced, quantities of pus being removed. Other abscesses were found in the same region. Pus was taken from one of these abscesses by Dr. Fisher on March 29th, which was examined culturally, yielding a pure staphylococcus. Of her three kids, one soon appeared to droop and eruptions containing pus covered the whole abdominal region and inside the legs. His knees were swollen and when lanced emitted the same pus. Postules appeared between his toes so that he was unable to walk. With care and treatment by the owner he recovered, although was undersized. The second triplet had the knees affected, also an abscess on the nose that had to be opened. No pustules were seen and he made a good recovery. The third triplet had no trouble. The mother was treated with Mixed Goat Bacterin, with quick recovery.

Case No. 5993, a doe presenting subcutaneous nodular-like swellings. Some of these had a tiny opening through the skin. By pressing nodules so opening, a thick caseous material would exude. A cultural specimen was taken by clipping the hair, disinfecting after washing and excision of the material with a sterile scalpel. The cultures disclosed a pure staphylococcus, This animal has remained untreated for almost two years with no lessening of the number of nodules. She is now undergoing bacterin treatment.

Case No. 6097, was a young doe that had been diseased for over a year. The original owner had used various local dressings without avail. Finally, discourged and not wishing to have

the animal on the premises, because of danger of infecting other goats, the doe was given to a family some distance away, who desired it. The new owners also tried to remedy the condition, with no results. In October, 1917, specimens were taken and the staphylococcus was present pure. Bacterin was prepared and treatment begun in November. In December the animal had made a complete recovery, which has been permanent up to June, 1919.

Case No. 6055, a 5-months-old kid, in November, 1916, developed a rheumatic trouble; the joints becoming stiff and the animal rapidly became almost helpless, knees swollen, ankle joints weak, ears covered with small eruptions. At times she had to be lifted to her feet and coaxed with the best of food to keep her alive. Only one or two injections of the bacterin were given, with the result that the animal was completely recovered. However, two years later, she has developed a nodular stage and treatment is now being conducted in which we will administer several doses of the bacterin.

Case No. 5923, was a 2-year-old purebred Toggenburg doe. She developed pustules soon after kidding. From these pustules we isolated a staphylococcus in pure culture and after injecting a bacterin prepared from a mixed lot of goat strains, recovery soon was accomplished.

Case No. 6246. In July, 1917, a doe, some seven years old, broke out with pustules. Excellent care and treatment was given by the owner with varying success. In March, 1918, Dr. Fisher was called, and recognized the above-described disease. Pus was taken, from which the same organism was isolated. After a few doses of autogenous bacterins were given, recovery was very rapid. In May, 1918, the doe looked in excellent condition and pregnant. About the time of termination of pregnancy in July, she became very sick, not eating anything for five days and breaking out with large areas of confluent pustules. There was a bloody vaginal discharge but no pregnancy. Later the owner gave us the goat for investigation. Autogenous bacterin soon brought her back to condition. In December, 1918, she developed a light attack again and during January to March, 1919, a heavy treatment of bacterin was given. Now she is in fine condition and gives hopes of being productive. No pustules or nodules have been observed since treatment started in January. None of these cases presented pictures resembling those observable in Takosis.

Our first impression was that the cases presented lesions resembling those observed in cow-pox. The skin was covered with many scabs averaging one-quarter inch in diameter, or coalescent to include large areas. The hair was in tufts and the animals showed evidences of marked irritation. These pustular eruptions were most frequently present on the udder, thorax, on the back near the tail, and on the inner surface of the limbs. If one lifted the scab, there was disclosed to view a small crater-like depression about one-quarter inch deep, highly inflamed, and the cavity contained a small quantity of creamy pus, somewhat tenacious in consistency, from which we later made bacteriological examinations.

At the time of our first visit we inquired into the history of the cases and learned that the condition had been introduced from the southern part of the State, and Arizona, from which places this herd was partially built up. The disease spread rapidly through a large herd, especially affecting the young does soon after freshening. In this way much loss was caused in milk flow and flesh. This new stock arrived in the summer of 1916 and it was not until March, 1917, that the cases were brought to the attention of Dr. Fisher. During the interval between the summer of 1916 and March, 1917, the condition had persisted. We were informed that experimental inoculation had been attempted by scarifying the udder and rubbing vesicular contents on the scarified area. This apparently would render the outbreak on the udder less severe, but would not confer complete immunity. Local antiseptics were resorted to with the result that the particular lesions treated would heal, but the condition would break out soon on some other portion of the body. Various types of lesions were observed and treatment was resorted to in each. The various forms observed were three in number.

The first was the initial appearance of the pustule. This form would continue for three to four weeks when the majority of the cases would recover. But in some cases recovery did not take place, and it was these chronic cases that the authors had occasion to observe. Then here, besides the skin eruptions, we would frequently find a second form consisting of a subcutaneous swelling which varied in size from a small shot to a glandular-like swelling the size of a walnut. Incision of these swellings disclosed a caseous pus without odor which would yield upon cul-

turing a Gram positive staphylococcus resembling in all respects the organism isolated from the pit of the pustule. These subcutaneous swellings were usually present on the face, back, sides, and inner surface of the limbs. The larger nodules were visible from a distance; the smaller ones being readily felt when stroking the hair.

A third condition observed and which readily yielded to bacterin therapy was arthritis involving the forelimbs particularly. At some times it would be so severe that the animals would have to be lifted manually to get them on their feet. Abortions occurred in many cases and sterility resulted in certain cases. One of these apparently sterile animals was observed closely and when brought into good condition following gradually increased injections of bacterins, was bred and appears to be pregnant at the time of this writing. We have not worked with the abortion cases to any extent, but believe there is a connection between the frequent abortions occurring in infected herds and the organism we have studied. The usual type of infection referred to us was benign in character, only two animals showing a malignant form of the condition. These consisted of two kids whose heads were caught in their feeding stanchions with a result that the tissues of the neck were badly bruised, but the skin was not broken. The area affected became swollen and later edematous. The temperature reached 107 degrees Fahrenheit. Both kids evidenced great suffering and prostration. They were killed to relieve their further suffering. Dr. Fisher conducted a thorough post-mortem of these animals and found the following condition present: There were no lesions other than locally, the tissues of the neck region were extensively hemorrhagic and edematous. In the auditory canal was a caseous pus. In the lymphatic glands of the throat was a marked congestion. Cultures were made from the glands, auditory canal and spinal fluid. In all of these a pure growth of the staphylococcus was obtained. Catching the heads in the stanchions was believed to be the immediate cause of the swelling, yet the organism was in the system apparently dormant but waiting for a traumatic area in which to localize.

It was believed that if we were contending with true goatpox one attack should confer an immunity to the disease, but this did not appear to be the case. It was therefore decided that an attempt to isolate organisms from the pus contained beneath the cap of the scab would be of interest. Accordingly several speci-

mens were taken from various goats and forwarded to the laboratory in Berkeley. In all of these specimens the same organisms were isolated in pure culture. In all of our work the utmost care was employed in taking specimens to prevent the entrance of contaminating influences. Sterile instruments were used to lift the cap after the area had been clipped, washed and disinfected. The small amount of pus was then collected on a sterile swab and immediately returned to a sterile test tube. Cases that had not been treated, but whose histories informed us that the condition had been present for over a year and a half, as evidenced by continual nodules on the body, yielded positive cultures from the cheesy-like pus excised.

BACTERIOLOGY OF THE DISEASE.

Inasmuch as the organisms isolated were culturally and morphologically similar to each other it was decided to employ autogenous bacterins prepared from them to determine if these strains were of therapeutic value. These bacterins were prepared by the usual methods. The cultures were first examined for purity. The organism is a staphylococcus having an orange pigment and producing marked hemolysis on uncooked rabbit's blood. This quality of causing hemolysis is retained even in cultures over two years old. At first the organisms stained unevenly by the Gram method, but later became stabilized, staining readily by Gram's method. Once the purity of the cultures was proven, sub-cultures were made and incubated 24 hours at 37.5° C. They were then scraped in physiological salt solution and sterilized at 56° C. for 30 minutes. They were preserved with 0.5% phenol and diluted to a standard of 500 million organisms per milliliter. After this they were tested for sterility and bottled. At first analogous strains were used on the respective cases, but later on the strains were incorporated into a mixed bacterin with equally good results as compared to the autogenous preparations.

We endeavored to demonstrate the specifiicity of the organisms by experimental inoculation of rabbits, guinea pigs and normal goats. A heavy suspension of fresh cultures was made, using physiological salt for the diluting medium. With an intradermal tuberculin needle small quantities of the inoculum were injected underneath the skin. In the case of the rabbits and guinea pigs, only a slight traumatic inflammation was observed. This disappeared within 24 hours. However, in the goats marked swellings resulted, which later became necrotic and

large patches of skin sloughed away. The areas from which these sloughs came, persisted raw and necrotic. Healing could not be induced even though antiseptic dressings were applied frequently. A few weeks later it was decided that the bacterin should be used to endeavor to remedy the condition. This was done, with a resulting rapid and complete recovery.

Agglutination tests were then attempted, using normal goat serum for controls and the serum from goats naturally infected. The positive cases agglutinated in dilutions of 1-400 while the normal sera did not agglutinate even at 1-10 dilutions.

Four cases of transitory infection by the pustular form in the case of the human have been reported to us. These persons were engaged in the care and milking of the animals infected. One of these parties had been vaccinated against smallpox several times, yet contracted the pustular type of infection twice at intervals of a year.

So far as the area in which this condition is found is concerned, we have personally taken observations of five herds, three of which are situated at wide limits from each other, the remaining two being about two miles apart. From these five herds we obtained the same organism, as judged by its morphology, pigment and hemolytic properties. In the goat journals are numbers of queries from many sections in which the conditions described simulates these we have observed. We believe the condition is quite widespread.

Recently Professor Ivan C. Hall of the University of California visited one of these herds with us. The chronic cases in this herd had been under bacterin treatment two years previously. The animals have been free from disease since then. At the time of our visit the goats were in the best of condition, with a yield of 25 gallons of milk each day from 32 goats. Only two animals showed any infection. These had the nodular form. They had not been treated previously. Specimens were taken and divided in two portions, one of which Professor Hall examined and we the other. Working independently we both isolated the staphylococcus.

SUMMARY.

1. A condition in goats, benign in character, but of economic importance through loss in milk production and flesh, has been observed. Lesions in early stages resemble goat-pox.

2. Whether true goat-pox or a condition having lesions simulating those observable in goat-pox has not been determined.

3. However, a pure Gram positive staphylococcus having an orange pigment, and producing marked hemolysis on uncooked blood agar has been isolated from every specimen taken.

4. Bacterins prepared from this organism produce a rapid recovery in cases affected.

5. This therapeutic value may be specific or non-specific, but the organism has been demonstrated as being particularly virulent for goats, but non-virulent for guinea pigs and rabbits.

6. Three distinct forms of infection have been successfully treated with bacterins. These forms are:

a. Arthritis.

b. Exanthemata.

c. Subcutaneous multiple abscesses.

7. Cases in which bacterin therapy is not employed do not recover rapidly, but may persist at least a year and a half.

STUDIES ON ANTHELMINTICS.*

II. THE ANTHELMINTIC AND INSECTICIDAL VALUE OF CARBON BISULPHIDE AGAINST GASTRO-INTESTINAL PARASITES OF THE HORSE.

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By critical experimental methods, *i. e.,* treatment followed by careful examination of the manure and post-mortem examination, it has been found by Hall (1917) that carbon bisulphide is apparently 100 per cent effective against bots; by the same methods, it has been found by Hall, Wilson and Wigdor (1918) that some of the common anthelmintics are not adequately effective against ascarids in the horse, even such drugs as oil of chenopodium, highly ascaridal for ascarids in other hosts, falling far short of 100 per cent efficacy. Using these same critical methods, we find that carbon bisulphide, in addition to being 100 per cent effective in removing bots, is almost that effective in removing ascarids. This drug has been used heretofore against ascarids

* Read before the Southeastern Michigan Veterinary Medical Association, Detroit, Mich., April 9, 1919.

in the horse, but in the absence of critical tests, its real efficacy was a problematical quality. We are now able to report that in carbon bisulphide we have a dependable remedy for the refractory ascarid of the horse. This information fills a distinct gap in our knowledge of dependable treatments for parasites of the horse, and in connection with the findings of Hall, Wilson and Wigdor (1918) to the effect that oil of chenopodium, properly used, is approximately 100 per cent effective against strongyles, cylicostomes and pinworms in the horse, it establishes the topic of anthelmintic treatment for the common parasites of the digestive tract of the horse on a sound basis of tested and dependable drugs.

Our method was the same as that used by Hall, Wilson and Wigdor. The horses were dosed by, and the fasting, feeding and care of manure supervised by, one of us (Smead). The examination of the manure for worms and bots passed and the post-mortem examination of the digestive tract were made by Hall, Smead and Wolf, assisted by J. R. Stafford. No effort was made to detect cylicostomes in the manure or to count them post-mortem. However, if cylicostomes had been present in the manure to any extent they would probably have been detected, and it is our opinion that practically none were passed.

Food was removed from 8 horses at noon, March 10, 1919, and the animals were given their first, or their only, treatment with carbon bisulphide in hard capsules about 8:30 the next morning. No purgatives were given. In view of the new data relative to the time required for dead bots and worms to pass from a horse under these conditions, we give the protocols rather fully.

Horse No. 1094 was given 6 drams of carbon bisulphide in 1 dose. On the succeeding days, in their order, this horse passed the following: 1 bot, 0 ascarids; 2 bots, 0 ascarids; 58 bots, 1 ascarid; total 61 bots, 1 ascarid. The horse was killed the third day after treatment and had 105 dead bots and 5 dead ascarids in the large intestine on their way out. The drug removed 166 bots and 6 ascarids, leaving none in the stomach or small intestine. This horse had 85 pinworms, hundreds of *Strongylus* spp. and thousands of *Cylicostomum* spp. The treatment was therefore 100 per cent effective against bots and ascarids and 0 per cent effective against pinworms, *Strongylus* spp. and *Cylicostomum* spp. (We assume from the number of cylicostomes left, together with the failure to remove *Strongylus* and pinworms, that the treatment was an entire failure against cylicostomes,

even though the manure was not closely examined to see if any of these were passed.) The stomach and small intestine were normal.

Horse No. 1093 was also given 6 drams of carbon bisulphide in 1 dose. On the succeeding days this horse passed bots as follows: 0 bots; 8 bots; 70 bots; 77 bots; 36 bots; 48 bots; 33 bots; 5 bots; 2 bots; total, 279 bots. This horse passed 2 ascarids on the third day after treatment and 2 or 3 at a later day; owing to a misunderstanding, exact records were not kept for these worms. The horse was killed the ninth day after treatment and had 2 bots in the double colon and no ascarids anywhere. This horse had 1 pinworm, hundreds of *Strongylus* spp. and some *Cylicostomum* spp. The treatment was therefore 100 per cent effective against bots and ascarids and 0 per cent effective against pinworms, *Strongylus* spp. and *Cylicostomum* spp. The stomach showed a healing inflamed area in the cardiac portion.

Horse No. 1092 was given 4 drams of carbon bisulphide at 1 dose and this dose was repeated 2 hours later. On the succeeding days, in their order, this horse passed the following: 0 bots, 0 ascarids; 0 bots, 1 ascarid; 0 bots, 4 ascarids; total 0 bots, 5 ascarids. The horse was killed the third day after treatment and had no bots anywhere; it had 2 live ascarids in the small intestine and 38 dead ones in the large intestine. There were 9 *Strongylus* spp., some *Cylicostumum* spp. and no pinworms. The treatment was therefore over 95 per cent effective against ascarids and 0 per cent effective against *Strongylus* and *Cylicostomum* spp.; no data regarding bots and pinworms, as these parasites were not present. Cardiac stomach was inflamed and showed adherent mucous exudate.

Horse No. 823 was also given 2 4-dram doses of carbon bisulphide at a 2-hour interval. On the succeeding days this horse passed the following: 1 bot, 0 ascarids; 0 bots, 2 ascarids; 1 bot, 10 ascarids; 1 bot, 4 ascarids; 0 bots, 6 ascarids; 0 bots, 3 ascarids; 0 bots, 0 ascarids; 0 bots, 1 ascarid; total 3 bots, 26 ascarids. Subsequent to the eighth day after treatment, no bots or ascarids were passed. The horse was killed on the seventeenth day after treatment and had no bots or ascarids anywhere. There were hundreds of *Strongylus,* thousands of *Cylicostomum* and no pinworms. The treatment was, therefore, 100 per cent effective against bots and ascarids, and 0 per cent effective against *Stron-*

gylus and *Cylicostomum.* In passing, it may be noted that the small number of bots present in this horse is correlated with the fact that this animal had not been on pasture the previous summer, but had been kept in the stable or allowed in a bare lot for exercise. The inflammation of the gastric musoca, following treatment, had almost entirely subsided.

Horse No. 1091 was also given 2 4-dram doses of carbon bisulphide at a 2-hour interval. On the succeeding days this horse passed bots as follows: 0, 7, 13, 6, 4, 2, 2, 0, 1, 0, 0, 0, 0, 0; total, 35 bots. This horse also passed 3 ascarids, but the exact date was not recorded. The horse was killed the fourteenth day after treatment and had no bots or ascarids post-mortem; it had hundreds of *Strongylus* spp. and numerous *Cylicostomum* spp., but no pinworms. The treatment was therefore 100 per cent effective against bots and ascarids, but 0 per cent effective against *Strongylus* and, apparently, *Cylicostomum.* There are no conclusions regarding pinworms, as these were not present. There had been some inflammation in the cardiac stomach, but this had almost entirely subsided at the time of necropsy.

Horse No. 897 was also given 2 4-dram doses of carbon bisulphide at a 2-hour interval. On the succeeding days, this horse passed no bots. At some date it passed 1 or 2 ascarids, but, owing to a misunderstanding, no records of the number of worms or the date were kept. The horse was killed on the fourteenth day after treatment and was found to have no bots. There was 1 live ascarid in the small intestine. The horse had 4 pinworms, numerous *Strongylus* and some *Cylicostomum.* The treatment was not entirely successful against ascarids in this case, removing 1 or more and leaving 1. This is probably due to the worm being in the lower ileum and the drug being largely absorbed before reaching the site of the worm. The treatment was 0 per cent effective against pinworms, *Strongylus* and, apparently, *Cylicostomum.* There are no conclusions in regard to bots, as there were none present. This freedom from bots is correlated with the fact that this animal had been kept off pasture the preceding summer. The stomach of this animal showed evidence of an inflammation, in the cardiac portion, that had almost entirely subsided.

Horse No. 1100 was given 3 doses of 3 drams each of carbon bisulphide at 1-hour intervals. On the succeeding days this horse passed the following: 0 bots, 0 ascarids; 31 bots, 4 as-

carids; 58 bots, 2 ascarids; 29 bots, 0 ascarids; 14 bots, 0 ascarids; 13 bots, 0 ascarids; total 145 bots, 6 ascarids. The horse was killed the sixth day after treatment and had 15 dead bots in the large intestine and no ascarids anywhere. There were 4 pinworms, hundreds of *Strongylus* spp. and some *Cylicostomum* spp. The treatment was therefore 100 per cent effective against bots and ascarids and 0 per cent effective against pinworms, *Strongylus* spp. and *Cylicostomum* spp. A considerable portion of the cardiac stomach was highly inflamed.

Horse No. 1106 was given the same treatment, 3 doses of 3 drams each at 1-hour intervals. On the succeeding days this horse passed the following: 0 bots, 0 ascarids; 17 bots, 1 ascarid; 12 bots, 1 ascarid; 7 bots, 0 ascarids; 6 bots, 0 ascarids; 1 bot, 0 ascarids; 0 bots, 0 ascarids; 0 bots, 0 ascarids; 0 bots, 0 ascarids; 1 bot, 0 ascarids; total 44 bots, 2 ascarids. After the tenth day no parasites were passed. The animal was killed on the seventeenth day. One dead bot was found in the double colon and no ascarids anywhere. There were numerous *Strongylus,* innumerable *Cylicostomum* and no pinworms. Treatment was, therefore, 100 per cent effective against bots and ascarids, and 0 per cent effective against *Strongylus* and, apparently, *Cylicostomum.* The inflammation of the gastric mucosa had almost entirely subsided.

A consideration of the foregoing shows the following:

Carbon bisulphide has a dependable efficacy of approximately 100 per cent against bots and ascarids, the two common and important parasites occurring in the anterior portion of the digestive tract, *i. e.,* the stomach and small intestine, of the horse. In our animals, the bots were mostly *Gastrophilus nasalis,* with a few *G. hemorrhoidalis;* the ascarids were the common *Ascaris equorum (A. megalocephala).* In our experiments, it was uniformly 100 per cent effective against bots, removing all of 690 bots from the 6 infested animals, and usually 95 to 100 per cent effective against ascarids, removing (approximately) 91 of 94 worms from the 8 infested animals, or almost 97 per cent.

Carbon bisulphide gives as good results in 1 6-dram dose as in 2 4-dram doses or 3 3-dram doses, and it is likely that the smaller sum total of drug in the one dose is to be preferred to the greater total in several doses, especially as the gastric lesions seem less pronounced with the 1 dose. It is quite possible that further experiment will show that a single dose even smaller than 6 drams will be adequate. Dove (1918) found that young bots

could be killed by carbon bisulphide in 45 minutes, while last-stage larvæ required almost 3½ hours, *G. intestinalis* being more resistant than other species. The question as to whether carbon bisulphide in one dose remains in the stomach long enough to remove the bots, and perhaps remains as much as 3½ hours, would seem to be answered in the affirmative by the sucess of our 1-dose treatment.

Carbon bisulphide given without purgation will remove the bots, but they will usually not be found in the manure for the first 24 hours after treatment, and the maximum number are apt to be in the manure of the third day, and may be in that of the fourth day after treatment. Dead bots may be passed for 10 days and others may still be present in the large intestine 17 days after treatment. Where purgation is employed, bots may come away in the first 24 hours, according to Dove (1918), usually the following day, however, and may come away for 5 days, according to the findings of Hall (1917) and Dove (1918).

Ascarids usually come away on the second and third day, but may come away as late as the eighth day.

Carbon bisulphide is of no value against worms in the posterior portion of the digestive tract, the cecum, colon and rectum, *i. e.,* against pinworms, *Strongylus* and *Cylicostomum.* This is perhaps due to the rapid absorption of the drug in the stomach and small intestine, and this may account for the occasional escape of an ascarid located in the lower portion of the small intestine. The simultaneous administration of linseed oil might serve to carry the carbon bisulphide in solution down the intestine more rapidly, increasing its efficacy against ascarids. Whether it would cause the removal of any worms from the large intestine is doubtful. Hall (1919) has reported two experiments where horses given a 20-mil dose of carbon bisulphide, or two such doses at 2-hour intervals, followed in 1½ to 2½ hours by 800 mils of linseed oil, entirely failed to remove any strongyles.

In this connection, it may be said that the carbon bisulphide is soluble in oils, but is practically insoluble in water; Dove (1918) is in error in stating: "The carbon bisulphid, being soluble in water, evidently reaches all portions of the stomach, either as a gas or in solution." A common laboratory test for iodine is that employing a discrete undissolved bubble of CS_2 at the bottom of an aqueous solution.

Obviously, adequate anthelmintic treatment for removal of all the common species of worms and bots from the horse would require consecutive treatments with carbon bisulphide and oil of chenopodium, the two anthelmintics now known to be dependable for the purpose.

The lesion due to carbon bisulphide given in hard capsules consists in inflammation in the cardiac portion of the stomach, usually over an area the size of a man's hand or larger. This inflammation, when present, subsides almost entirely in the course of two weeks. The fact that horse No. 1094 had a normal stomach on the third day after treatment with 1 6-dram dose, suggests that this single-dose treatment occasions less local damage than repeated doses; certainly the amount of toxic drug absorbed is less.

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Dr. R. O. Suddath is now located at Marietta, Ga., instead of Auburn, Ala.

Dr. B. F. Davis, state veterinarian, has his headquarters at Cheyenne, Wyo.

Dr. L. A. Danielson is now located at Santa Rosa, Calif. His former address was Madera, Calif.

Dr. D. L. Allen, Resident Secretary for Alabama, is now located at Prattsville. His former address was Auburn.

CLINICAL AND CASE REPORTS.

VERMINOUS CATTLE.

By E. Horstman, Baton Rouge, La.

Internal parasites infesting live stock are the bane of the southern cattle owner and stock raiser in the lowlands and marshy ranges of the south, when infection once gains a start on such pasturage. Burning off the range is impractical owing to the extensive area and wooded portions, since the entire pasturage acreage is generally given over to the stock, to roam at will, it is all then considered infected on any one farm. There is no free part to which the stock could be moved after treatment, without entailing the expense of renting other premises than your own, until such time that the infected range could be made clean by rotation.

Sheep raising under these conditions is a hazardous undertaking and is responsible for there not being more of this industry in a country that otherwise would make this a very profitable investment. Hogs likewise are found, in many so-called outbreaks of hog cholera, to be suffering from infestation of intestinal and kidney parasites.

Cattle have suffered less. However, a number of owners having reported illness in their herds, on investigation they were found to be infested with the twisted stomach worm (Hæmonchus contortus).

Figure 1 is that of a three-year-old heifer, "Hereford," treated for twisted stomach worms, "Hæmonchus contortus." Life prolonged for about five months. Post-mortem showed gastro-enteritis, a deep red and thickened stomach membrane.

By application of the copper sulphate treatment as prescribed by the Bureau of Animal Industry: 1 pound crystallized bluestone, powdered, dissolved in 9½ gallons of warm water, used as a drench, twice, 12 days apart, 7 ounces to yearlings, 16 ounces to mature cattle, has been found effective, when the cattle could be moved to new pasturage after treatment.

Cattle suffering from this parasite are nearly always in such a debilitated state that the treatment with copper sulphate is very drastic and more than they can withstand. Restoration by tonics and stimulants from the enfeebled condition is first in order.

At the "W. C." ranch, Lafourche Parish, La., which lies about nine feet above sea level, the experience with the "Hæmonchus contortus" and other internal parasites, among them the whip-worm, "Tricocephalus affinis," the lung worm, "Dictyocaulus viviparous," tapeworms and the grub larvæ have proven extremely costly to the owners.

Fig. 1.

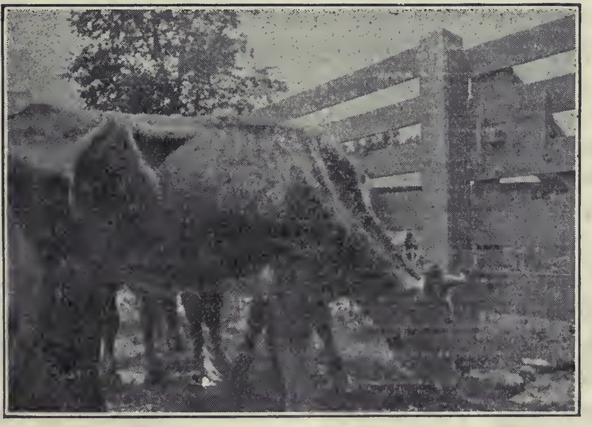

Fig. 2.

Figure 2 shows extreme emaciation of a four-year-old native cow, Jersey, found down and in dying condition, was destroyed. On post-mortem the whip-worm, "Tricocephalus affinis," and innumerable grub larvæ were found, with inflammation of true stomach and smaller intestines.

This ranch contains about 2500 acres, over which approximately 1000 head of cattle, "Herefords," have free access. This ranch was stocked about one year past with white-face cattle from Texas. Trouble soon began and cattle were dying at the rate of 4 to 5 each week. A significant point noticed was: The sick were confined to the last lot imported; the others, of the first shipment, apparently were not affected, indicating almost conclusively that the trouble, whatever it was, came with the shipment and was not a native disease. The staggering gait, swelling under chin, emaciation, membranes anæmic, copious evacuations, no temperature, appetite good though variable, pointed to worms. On post-mortem the previously mentioned parasites were found in profusion, and the animals suffering from Verminous Bronchitis with lungs congested, others from gastro-enteritis, due to the twisted stomach worm. All fats, heart, kidney, mesenteric and extending to orbital fossa were of jelly-like consistency, a veritable cachectic condition. The question arises here: Why are these cattle not showing above symptoms at their native heath in Texas? If they brought the infection with them, which it is claimed they did, and since the "W. C." ranch had no cattle on it for years prior to the present stocking, the infection could not have been present upon their arrival, to be picked up. Does acclimation changes have anything to do with verminous virulence? Concluding it does not, there must be some mistake as to the history of origin of these parasites.

Every veterinarian of note for miles around has passed on these cattle and held post-mortems, and as one of them characteristically writes the following: "Nothing of additional information was found. Worms were present in every case, all kinds of worms — lung, stomach, round and tapeworms. The animals are still dying at the rate of one a day." This was the mortality at the time; however, the end of deaths has been apparently reached, as there were but four left of the sick lot when last seen; all of the herd otherwise looking fat and well.

Some have recovered, others recovered apparently, had a recurrence and died; most of them lingered along from two weeks to five months and eventually died. The copper sulphate treatment was applied and aided the weaker ones to hastily make their exit from this mortal coil.

STERCOREMIA OF SHEEP.

E. A. Bruce, Agassiz, B. C.

Stercoremia is defined in Dorland's dictionary as a "toxic state occasioned by poisons absorbed from retained feces."

This term is believed to more correctly describe a condition that has heretofore been called preparturient eclampsia or post-partum paralysis. Such a condition was recently investigated in a flock of sheep in which 92 fatalities occurred.

HISTORY.

The location of these sheep was in the lower Similkameen Valley, close to the Washington State border. The flock consisted of 719 sheep of mixed breeding, chiefly grade Suffolk and Merino. The sexes were as follows: Rams 12, wethers 123, ewes 584; of the latter about 135 were yearlings, of which some 50 or 60 were not with lamb.

Winter feeding started on January 14 on a redtop hay which contained a small amount of ergot, a not uncommon occurrence in the interior of British Columbia. It is, however mentioned, as one veterinarian who saw these sheep diagnosed their complaint as ergot poisoning. On February 1 the feed was changed to alfalfa and was gradually increased until by the 25th they were being fed heavily. Lambing was due to start about March 1, and all sheep were in a fat condition.

Good water was always available, but a number of animals showed a preference for snow. Salt was regularly supplied, 14 pounds of sulphur being mixed with 100 pounds of salt. About lambing time some chopped oats and bran was fed. Shortly after the trouble started some turnips were offered, but were not readily eaten, apparently because the animals were not accustomed to roots. The animals being fasted, it was noticed that they ate a lot of cactus *(Opuntia sp.)* and it was thought that they had been eating some before.

On February 17th the owner wrote this laboratory to the effect that he had lost 9 fat ewes with lamb, and described symptoms which indicated a feeding trouble; advice was given to cut down the feed and to give lots of exercise. This letter was held up in the mail, but on March 6 he fasted them for four days; at that time 150 animals were down and others showed sickness. On the fourth day many passed feces, and on the two following

days many more were relieved from the constipation, which had been general. During this time it was noticed that the sheep were eating a lot of cacti; this no doubt helped, as it is known that some species of *Opuntia* are laxative; on the other hand, they may serve to form phytobezoars.

A telegram having been received to the effect that some 50 sheep had died, it was decided to investigate the trouble in person. This was done on the 13th of March, by which date further fatalities had occurred and a large number of other animals were in a precarious condition.

The feed had been cut down, but the sheep were still without sufficient exercise or laxative food, such as roots or linseed oil meal. No new cases had shown up for five days, nor were any seen by me. The day after I left some occurred; the owner then fasted the sheep for two days with good results. All ewes that looked like lambing were then put into a corral and fed lightly on alfalfa and turnips, which they would now eat freely. Latest reports are that these ewes have lots of milk and that no new cases have developed. The balance of the flock—wethers, ewes that had lost their lambs, and ewes that had their lambs—were fed on alfalfa in a pasture near the corral for seven days, when some of them appearing dumpish the owner quit feeding and took them to the hills; good results followed, due no doubt to the fact that they were at last getting the exercise necessary in having to find their own food.

All the ewes were affected and 92 died. All the wethers were affected, but only two were badly so, and none died. The 50 or 60 yearling ewes not with lamb were all affected to the same extent as the wethers, as were the rams.

SYMPTOMS.

The early symptoms, which unfortunately were not seen in person, are stated to be as follows: The animals appear dull, hang their heads and let the ears droop, are off their feed and constipated, froth a little at the mouth, but frothing does not last over one day; there is a nervous movement of the head and ears and the head may be carried high or to one side; there is apparent blindness, an unsteady gait and grinding of the teeth. The degree of sickness varies, some may keep on their feet, but the bad cases go to the ground in from one to four days; the fattest ewes go down the quickest. When they first go down there are slight nervous spasms, afterwards they lie for days

almost motionless. Animals that had received doses of salts or oil suffered severely for seven or eight days, grinding the teeth and having nervous spasms every little while. The majority lie in a comatose condition, but occasionally the feet may be moved a little; urine, which appeared normal is passed, and feces may be after the lapse of several days. Such feces are in a mass indicating the fixed position of the animal, and the masses show the first feces to be very hard, gradually becoming softer and mixed with sand, bile and sometimes blood. The presence of bile and sand is often well marked. The animals usually lie on one side with the head slightly drawn back, but in one instance a sheep was seen which laid for days in the normal attitude of sleep and eventually died in the same position. The shortest time an animal was sick is said to be ten days, and the longest time three weeks.

Many ewes give birth to premature lambs, usually only a few days off term, but in one instance the owner claimed birth was twenty days ahead of time. Even after being down five or six days, and in one case eleven days, living lambs were born; in fact, over 90% of such lambs are born alive. When parturition occurs, and if defecation has taken place, the ewe can often stand if helped to her feet, and will recover. It is interesting to note that the ewe which had a lamb after being down eleven days has made a complete recovery, notwithstanding the fact that no food or water was taken for that length of time, and probably for a day or two before. There is usually no elevation of temperature, but such may appear, as in some cases gangrene of the bowel occurs through continued pressure of fecal masses; the respiration is shallow and the pulse fast and weak. About 35 ewes were dry after recovery, and in all the milk was scanty or absent for one or two days. This was responsible for a heavy mortality in lambs (number undetermined), many being killed for lack of mothers. In some instances where recently recovered ewes had enough milk to suckle a lamb, the lamb would die, presumably either because it had become weakened in utero or that the milk contained some of the toxins absorbed from the intestinal tract. It may also be noted that lack of milk was noticeable in ewes which had not been down but which had been sick.

AUTOPSY.

In general lesions are confined to the abdominal cavity, there being intense constipation, a yellowish clay-colored liver and

fatty kidneys. The stomachs show no inflammation, but the rumen and omasum are full and contain some sand, the reticulum and abomasum may be empty or contain a little food. The small intestines are bile-stained. Hard fecal matter occurs all through the intestinal tract; in many instances oval masses some three to four inches long by one and a half to two inches in diameter are found; such masses may consist largely of sand and gravel. In cases where these have exerted continual pressure, gangrene of the bowel occurs, with a resulting peritonitis and invasion of the body by organisms from the intestinal tract.

The presence of sand was no doubt largely due to the sheep picking up the same when eating cacti. No evidence of perforation by the spines of cacti was noticed, neither were the oval masses cactus phytobezoars.

The spleen, heart and lungs appear normal, but the latter naturally show some congestions, due to the long time the animal has been on the ground. The kidneys are fatty, and the liver varies in color, but is usually a yellowish clay color, the gall bladder is full of a light-colored bile. The urine looks normal, but unfortunately none was collected for laboratory examination. *Cysticercus tenuicollis* was not an uncommon parasite. Microscopical examination of the heart, liver and kidney of animals which had been down for a number of days, show that there may be a slight degeneration of the heart muscle, necrosis and fatty infiltration of the liver, fatty infiltration of the kidney and a diffuse glomerular and tubular nephritis.

TREATMENT.

If given early enough a dose of salts or oil and enemas are of benefit, but experience shows that badly affected animals suffer acutely if drenched and usually die.

Should any ewes show signs of parturition they should be delivered at once, and providing defecation has occurred (as sometimes happens under the influence of bile secretion), they may then be helped to their feet, and carefully tended, when recovery will often result, even though the animal has been lying in a comatose state for days.

All sick animals that are able to walk should be made to take exercise, and should have their feed cut down sharply; actual starvation for two or three days will be beneficial if symptoms are aggravated. If possible, some succulent food, such as roots, should be fed, or small quantities of bran mash or

linseed oil meal. A liberal supply of salt should be provided, to which some charcoal may be added with advantage.

COMMENT.

While there may be other closely allied conditions in sheep, it seems reasonable to suppose that at least some of the cases which have been diagnosed heretofore as preparturient eclampsia and prepartum paralysis are in reality cases of stercoremia.

While such a condition exists in males and non-pregnant females, it is undoubtedly worse in pregnant ewes; this is probably due to the increased tendency to constipation through presure caused by the uterus, and to the fatty condition of the liver commonly seen in pregnant animals. One of the most important functions of the liver is that it is a neutralizer of poisonous proteid products formed in the intestine; given an increased tendency to constipation and a liver that is already somewhat altered, one can readily understand why the pregnant animal suffers the most. The gravid uterus undoubtedly plays some part, probably in providing that much more space for the accumulation of toxins, as once parturition occurs relief is afforded.

In this question of auto-intoxication, it must be remarked that all the tissues of the body are mutually interdependent. If one suffers, all suffer, and a disease of one organ or tissue is thereby apt to establish a vicious circle which is constantly enlarging.

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CASE REPORTS.

JAMES A. WAUGH, Pittsburgh, Pa.

Delayed Bovine Delivery — Water bag broke at 7 A. M.; owner delayed and did not call me until 5 P. M., after he had examined and "found the tail coming;" hind legs flexed at the hocks, and caught on the brim of the pelvis. I corrected the posititon and delivered a live heifer calf.

Had three cases last year: Two dead bull calves, and the owner raised the heifer calf. Examined and found another tail and hind limbs; then delivered a fine bull calf alive.

Fleming-Craig and Williams describe these conditions, but they are rare. Used only my hands and small ropes in delivery, but was well equipped with instruments. Dr. Rectenwald had converted and presented me with a "Farmer Miles" leg extender or spreader made into an obstetrical repeller, and I was tempted to use it, as the owner was out in the pasture after the cows and I feared it might be a thoroughbred calf, which I was anxious to deliver alive if possible in the absence of the owner —"Wanted to win!"

Silicate of Soda in Broken Limbs—I have had good success with silicate of soda solution in bandages applied to broken limbs.

A race horse (a pacer) broke an *os-corona* in a front limb in a race at Washington Fair last September. The animal is now in training and going sound.

Another, a large 5-year-old draft gelding, broke an *os-corona* in front leg in a runaway. This horse is now working on the farm, although his joint is stiff below the fetlock.

I have had dozens of cases in dogs, the last one being a broken tibia in a 7-year-old fat dog, which ended in recovery.

The Journal begs to acknowledge the courtesy of the Bureau of Agriculture of the Philippines for permission to use the following illustrations; of Mr. O. W. Barrett, of New York City, for obtaining the same; and of Dr. R. W. Shufeldt, of Washington City, for his kindness in sending them for publication; and while hermaphrodism and false hermaphrodism may not be unfamiliar to readers of The Journal in this country, it is believed that the illustrations shown, including the surra case. which was a monorchid, may prove of interest to many.

FIG. 1.

Surra case of long standing on Alabang Stock Farm. Scrotal and Preputial Edema. Monorchid: One testicle possibly removed, possibly abdominal. Not destroyed by edema because the one in evidence is apparently normal as to size and location. Preputial Edema dripping serum from lower surface of scrotum.

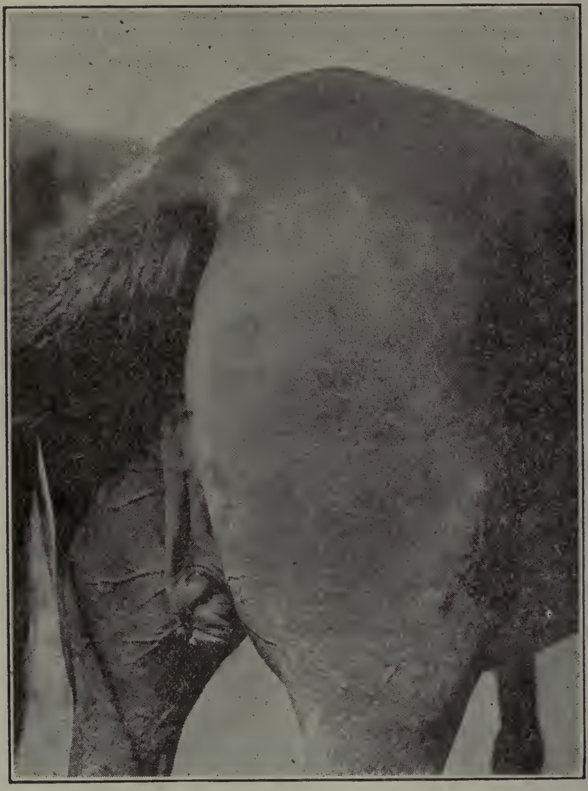


FIG. 2.

False Hermaphrodism in Native Horse—Mestizo (grade); sire and dam Mestizos. Only glans of penis normal; body of penis retrovergent; very short. Testicles probably inside of abdomen.

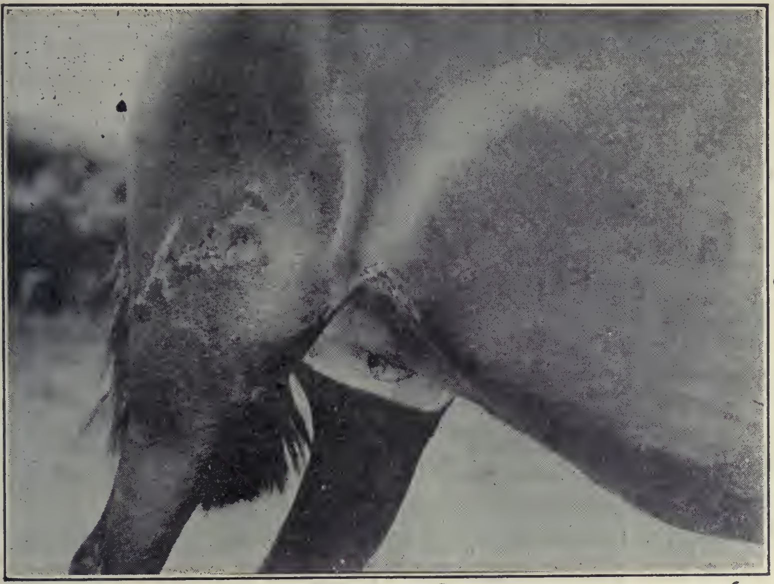


FIG. 3.

Same animal as shown in Fig. 2. Note the female side as shown by the teats.

ANOTHER VETERINARY SCHOOL.

The State College of Agriculture of Georgia for the first time announces a Veterinary Degree Course of four collegiate years leading to the degree of D. V. M.; also a combined course in Agriculture and Veterinary Medicine to occupy six years, the degree of Bachelor of Science in Agriculture to be conferred at the end of the fourth year; the degree of Doctor of Veterinary Medicine to be conferred at the completion of the entire course.

In announcing the course, the Bulletin of the College states: "The General Assembly of the State of Georgia, realizing the importance of the development of the live stock industries and the necessity for guaranteeing protection against the ravages of diseases which commonly decimate herds and flocks in localities not provided with efficient veterinary service, and wishing to provide means by which the services of graduate veterinarians may be guaranteed to the State and nation, has appropriated funds to the State College of Agriculture for the maintenance of a veterinary degree course."

This adds another school to the few veterinary institutions already established in the South.

ABSTRACTS.

ANÆSTHESIA IN ANIMALS.

BIBBEY (H.)
The Veterinary Record (London), June 7, 1919, p. 460.

From the correspondence in our daily papers and our Veterinary Journals it will be seen that there is a likelihood of an Act of Parliament compelling all operations on animals to be done under some anæsthetic.

If I might say a few words in favour of this Bill, I think as far as it goes it is a very good Bill, and in my opinion will help the profession very much; but I do think there should be no specified operations, but that all should be included.

For the last 20 years I have never done an operation except under some anæsthesia, and the operations performed have been many and various. I never had any cause for alarm or complaint, and I might say that if once a man operated under an anæsthetic he would never resort to the old method. There is the absence of increased help, and there is the comfort in controlling your patient to your requirements.

Now take the simple operation of docking. The colt or other older animal is caught, and the seat of operation put under local anæsthesia, and in a few seconds the tail can be amputated with the scalpel, and the arteries secured. There is never any evidence of pain, and the colt will stand in the same position after he is liberated. I have docked some thousands of colts of all ages, and never had to put one under restraint, beyond one man. I do all severe operations under chloroform, including parturition in ewes, and prolonged parturition in the mare.

Some weeks ago I was asked by a gentleman who is a member of the R. S. P. C. A. to castrate some colts, but I must put them under chloroform. The fee was fixed and the arrangements made. The first colt was brought out and cast on his side, and chloroform was administered; after some excitement the colt was under, and the operation performed to the owner's wish, but he thought the colt suffered a little when coming round. This I explained was the effects of chloroform and not under my control.

I then advised him to allow me to castrate the next colt under cocaine; this he consented to. The colt was cast on its side, same as the other one (which I may say is very simple and quick). After the usual antiseptic toilet the testicle was placed under cocaine, using a very long and fine needle (which is the secret of success). If the needle is plunged well into the testicle, which is very soft, the colt feels very little. After a time it comes under the anæsthetic, the scrotum is opened, the testicle is liberated, all the non-vascular parts separated, and with the castrator the operation is finished. Allow the colt to get up without any feeling of pain whatever; he walks off as if nothing had happened.

I asked the owner after if he wanted me to chloroform the third colt, but the cocaine had so pleased him, that I had to do the other the same.

At the time of writing this letter I have just operated upon a cow's teat for stricture of the duct, by opening the sinus halfway up under cocaine, without the animal being held at all. The teat was laid open and restitched, and the cow was chewing the cud while I had the teat at my leisure.

No doubt there are others using it for their work, but if my experiences of the use of anæsthetics is a means of helping others in the cause of humanity I am satisfied.

LECLAINCHE AND VALLEE'S POLYVALENT SERUM FOR THE LOCAL TREATMENT OF WOUNDS.

[Translations and abstracts by William N. Berg, Washington, D. C.]

On the specific treatment of wounds. Leclainche and Vallée: Compt. Rend. Acad. Sciences; Vol. 154, pp. 636-637, 1912.

(Translated verbatim.)

With rare exceptions almost, specific serotheraphy has been limited up to the present time to the treatment of infections or of generalized intoxications.

We have attempted to utilize the properties of a specific serum in the treatment of wounds. It seemed to us that such a medication should realize the desiderata of modern surgery in permitting the discontinuation of antiseptics, not only for aseptic wounds, but also for certain infected wounds.

The serum should at one time cover the surfaces with a protective layer favorable to the vitality of the cells and bring to

the phagocytes the antibodies which stimulate their phagocytic action.

Such a serum should be polyvalent and capable of assuring the destruction of germs habitually found in infected wounds. To obtain it we have submitted the horse to an immunizing treatment with the following varieties of microbes: staphylococci and streptococci of different varieties; colon bacilli and pyocyaneus of various strains. The serum should be rich in agglutinins, lysins, and amboceptors (sensibilisatrices); our animals were immunized subcutaneously and by repeated inoculations.

The bacterial bodies used were obtained from agar cultures or on the Maurice Nicolle medium (potato agar; gelose a la pomme de terre). Equal parts of the organisms are used in the mixture. The bacteria, killed by alcohol-ether, are then dried and preserved in vacuum in a refrigerator. For use, the dried germs are weighed, ground in an agate mortar, and emulsified with physiological salt solution. One injects from 0.005 to 0.050 gram of dried microbial bodies, corresponding to ten times the weight of the fresh microbes. The inoculations are made every 8 days, with increasing doses. After several months of treatment the subjects support the injection of 0.050 gram of fresh microbes, with nothing but vigorous local reactions and rises in temperature.

The serum obtained is very rich in agglutinins and amboceptors. The complement deviation test shows that these latter can fix quantities of fresh guinea pig complement frequently greater than 1 c.c., using either the microbial mixture used in treatment or any one of the germs composing it.

The amboceptors (sensibilisatrices), which represent the ferment essential to the intra-leucocytic digestion of the organism, act as they were a rigorously specific antiseptic, and they are brought in a vehicle undoubtedly favorable to cellular life and certainly incapable of harm.

We have used the serum for the treatment of the most divers accidents: wounds that are old or extensively relaxed (atones) and suppurating cavities. After washing with boiled water, an application is made of the liquid serum or of the dried, powdered serum.

The details of the observations need not be given here. In all cases the duration of cicatrization is noticeably shortened and it takes place very often with a surprising rapidity.

Comparative treatments with normal horse serum demonstrate the role of the specific bodies in the polyvalent serum. As might be expected, the medication is fully efficacious only if the wounds treated contain, as agents active in tissue disintegration, the species used in treating the producers of the serum. Thus only mediocre results are obtained in treating suppurating cavities caused by inoculation with (bacille pesteux) bac. of bubonic plague (observations of Prevot and Ramon).

With these reservations in mind, surgical therapy should benefit largely by the use of a serum obtained under the above described conditions.

On the Specific Serum Treatment of Wounds. Leclainche and Vallée: Revue Générale de Médecine Vétérinaire: Vol. 24, pp. 313-316, 1915. Translated verbatim.

The medication of infected wounds consists essentially in the destruction of germs which prevent or retard cicatrization. This destruction may be realized by the use of antiseptics or by the intervention of the organic defenses.

The inconvenience of antiseptics lies in the fact that they exert their destructive action on living elements at the same time, altering or killing the organic cell at the same time with the microbes introduced. On the other hand, the organic defenses, left to themselves, operate but slowly in the tissue repair; if this is insufficient, the local accident's progress or the infection becomes general through blood or lymph channels.

In the absence of an antiseptic selective to the microbial cell, which has not yet been obtained, the physiological treatment of infected wounds seems to be attainable only by provoking an exacerbation of the organic defense. To be efficient, this action should determine not alone the phagocytic absorption of the microbial agents, but also and always their intracellular digestion.

It is possible to provoke phagocytic absorption in various ways; certain physical agents and the application of normal horse serum act in this way. However, this ingestion of germs does not by any means imply their destruction; the parasitized cells are killed in large numbers and undergo purulent disintegration.

Experimental studies carried out during the past few years enable us to state that it is possible to assure the digestion of the

microbial agents in the wound by bringing to the organic cells, in a specific serum, the amboceptors (sensibilisatrices) corresponding; to conserve to the cells all their vitality and their aptitude for building repair tissue.

In March, 1912, we made known, in a communication to the Academy of Sciences, a method of obtaining a polyvalent serum which up to the present has been prepared in the laboratory and with aim toward scientific research. This serum has been experimented with in several service hospitals during the past years. Actual conditions have permitted numerous trials. It contains the antibodies corresponding to the diverse agents of inflammation and suppuration; numerous strains or varieties of staphylococci, streptococci, colon bacilli, pyocyaneus, proteus, etc. With these ærobes we have associated various anærobes: vibrion septique (malignant edema) and perfringens bacillus (also called Bac. phlegmonis emphysematosæ by Fraenkel; Bac. ærogenes capsulatus by Welch and Nuttall; the gas bacillus; bacillus of gas-gangrene).

The action of the polyvalent serum is exercised locally on all wounds of whatever origin, suppurating or not; it acts in the same fashion on mucous and serous membranes.

Not alone is its application painless, but the preëxisting pain diminishes and disappears almost entirely. In a number of cases, the pus has disappeared in 48 to 96 hours; in more grave cases, the characters of the suppuration have changed; pus that was fetid, sanious, colored, gave way to a light discharge which rapidly disappeared itself.

At the same time the wound cleans itself, the coatings disappear, the sphaceli (gangrened parts) are eliminated, non-detached flaps become repaired.

The disappearance of the suppuration and its modifications of appearance are constant; they characterize the action of specific polyvalent serum.

The transformation of the local condition is followed by a disappearance of secondary phenomena; edema, lymphangitis, local or diffuse; adenitis.

The temperature in cases of fever is lowered after the first dressings; in other cases, the application of the serum causes a thermal reaction, slight and temporary. The general condition of the patients improves and they experience a sensation of well-being. Cicatrization is rapid, a considerable gain is made over

the usual period, and the appearance of the cicatrices is irreproachable.

The mode of action of the polyvalent serum implied direct contact with the tissues.

This action is altogether different from that of normal horse or goat serum experimented with by various workers after the interesting researches of Raymond and Petit.

The specificity is demonstrated by an entire series of experiments. Its reactions in vitro are specific. It acts remarkably in the treatment of wounds of the horse, although it is naturally indifferent to the normal homologous serum; further, its action is limited to the horse infected with the species used in the preparation of the serum. This specificity is established clinically; fall in temperature, disappearance of pus, rapidity of action, after controls with other medicaments and especially with normal horse serum, fresh or heated.

The mode of action of the polyvalent serum implies the necessity of direct contact with the tissues injured, hence the necessity of various methods; surface dressings, soaked pads, injections into cavities or passages.

The medication should be completed by measures appropriate to the length of time the foreign body has been in the wound or sequestra in the tissues.

The role of the serum permits its use without the use of any antiseptic. By its coagulating and negative chemotactic action the antiseptic cannot help paralyzing or interfering with phagocytic action and that of the antibodies. A simple washing with water or physiological salt solution constitutes the sole preparation desirable.

The applications today are used for a most diverse variety of accidents; with regard to their form and location, but comprising in every case a microbial infection, various trauma, war wounds, anthrax, connective tissue inflammation (phlegmons), abscesses, suppurating arthritis and synovitis, infections of the eye, suppurating cutaneous affections, burns and chilblains, etc. In all cases very valuable and neat results have been obtained without the slightest serum sickness or anaphylaxis having been observed.

The polyvalent serum is also indicated in preventing complications in the simple wounds and trauma of operations. The serum dressing realizes a true physiological antisepsis the ad-

vantages of which are easy to foresee. It is indicated in all surgical interventions, especially where a sufficient asepsis is not realizable or complications are to be feared, by reason of the condition or location of the wound (emergency operations, natural predispositions (diathesiques), grafts, peritoneal and other serous infections, local gangrene, etc.).

In a detailed memoir we will communicate the observations that have been communicated to us. We here salute the memory of MM. Motais and Reymond and thank MM. Bazy, Delbet, Legueu, Monprofit, Variot, Cazin, Soulie, Gagey, Soubrel et al., who have been kind enough to experiment with the polyvalent serum and to coöperate with us. For this we are profoundly grateful. (1)

The use of polyvalent serum in veterinary medicine; L. Cuvillier; Revue Générale de Médicine Vétérinaire: Vol. 24, pp. 392-402, 1915.

p. 393. Bacteriological investigations made on pus from various sources showed that in the majority of cases the presence of varieties of staphylococci, rarely streptococcic forms were present.

Cuvillier used the serum for 2 years in various service hospitals in Paris, always with good results. Clinical details of 7 cases are given, some of which had been treated only with the serum, others had had antiseptics.

The Specific Serum Treatment of Wounds; Leclainche and Vallée; Rev. Gén. de Méd. Vét., Vol. 25, pp. 306-316, 1916.

pp. 306-8. General discussion of the shortcomings of antisepsis.

p. 308. Beginning with 1907, our investigations of the specific treatment of wounds led us in 1910 to obtain a serum active toward the most usual pyogenic agents and we have made a comparative study of its action and that of normal serum of the same origin.

As large a variety of microbes as possible is obtained from infected (p. 309) wounds of all kinds and different localities. Each type is cultivated separately. The totality of germs obtained, after drying in vacuum after the action of alcohol and

(1) The specific polyvalent serum is prepared at the laboratory of Professor Vallée at the Veterinary School at Alfort; at present the entire production is reserved for the exclusive use of the Health Service.

ether, are to be used, under rigorous conditions, for the progressive immunization of the horses to produce the serum. When a test shows the presence of a sufficiently high content of lytic and bacteriotropic antibodies, the animal is bled aseptically. The serum which they furnish is, in general, strictly sterile. However, on account of the accidental contamination by organisms from the air or wandering in the circulation, the liquid after transference to ampoules is submitted to tyndallization (intermittent sterilization) by repeated heating at 56-57. Kept at 38 for 4 days, the ampoules, before delivery, are individually controlled. Naturally, no antiseptic or other product is added to the serum; it remains entirely physiological.

p. 309. The antibodies may be detected by the ordinary laboratory methods (agglutination, complement deviation, measure of bacteriolytic power). It is only a matter of using the current methods and experiments that are always verifiable.

Observations demonstrate that an action that is local is exercised on the infected wound. This is shown especially by a clinical study of the comparative evolution of wounds treated with normal and with specific serum. This research on the horse permits most interesting observations. While normal horse serum is without action, as might be expected, the specific serum obtained from the same horse exercises a very evident action.

p. 310. In an infected wound the abundant suppuration of which has been dried up by one or two applications of specific serum, dressings with normal serum are followed by a return of the suppuration. It is, therefore, to its content of antibodies, and not to its physiological properties alone, that the specific serum owes its action. * * * the serum operates only against those varieties used in its preparation. (i. e., varieties of organisms.)

Over 300,000 ampoules of 5 c.c. of polyvalent serum have been delivered under our supervision.

The microscopic control of the exudates from treated traumata establishes the intensity of the phagocytosis stimulated by a favorable serum dressing. This is exercised especially on streptococci, staphylococci and pyocyaneus; one may even follow, using appropriate staining methods, the stages in the intracellular digestion of the phagocytized germs. However energetic this process may be, it never ends by a complete sterilization of the injured surfaces, and a culture from the local secretions

always shows them (p. 311) fertile. Aside from unforeseen conditions, a total cleansing can be accomplished only if the serum touch the fixed or migratory anatomical elements of the wound, and is renewed with sufficient frequency at their surface; necessities which are practically irrealizable.

* * * The local amelioration follows when it should, after the first dressings; but a complete action is not obtained until the medication is used regularly. Many failures called to our attention are due to the practice, so strongly contra-indicated, of using antiseptic washes before the serum dressing. * * *

p. 312. We have had in view only the production of a medication for wounds, the action of which is purely local.

Gradually, however, the serum from old producers acquired very manifest antitoxic properties. Accustomed to the hypodermic use of various serums, the medical corps naturally tried the polyvalent serum by this method, in the treatment of the infectious phenomena which accompany large traumata.

In this way it happened without any intervention on our part that several authorities in the surgical world have had recourse, in the treatment of large infected wounds, to intravenous or hypodermic injections of our serum. Because of the large number of favorable results obtained, we have set aside for this special use the serums from our oldest and most solidly immunized producers, making known to those interested that it would not be desirable to use hypodermically all of the polyvalent serum prepared by us. At this time, we have delivered two varieties of the same serum—one, fit for hypodermic use by reason of its great activity, the other, sufficient for dressings, reserved for this sole use.

p. 313. The fear of anaphylactic accidents should be no obstacle to the use of the polyvalent serum. * * * The local treatment of wounds with serum results in a slow penetration, which causes, according to Besredka, a progressive de-anaphylaxis, which, of itself, is sufficient to avert all serious accidents.

The contra-indication of the serum in cerebral surgery is a simple reminder of the classical lesson which must be formulated before the serum is placed in the hands of the physicians. The experiments of Besredka have shown that the brain reacts with extreme violence on the introduction of a small amount of serum in anaphylactic cases. All wounded should be considered as sensitized, at the time, by one or more injections of serum. It is

necessary to warn practitioners not aware of these facts against the temptation to apply locally on the centers a physiological liquid for the purpose of avoiding the dreaded effects of antiseptics. * * *

A too prolonged use of serum tends, at most, to the appearance of serum erythema or pseudo-erysipelatous lesions, always localized about the wound. The absolute innocuity of long repeated dressings in the cure of radiodermatitis systematically followed with great success in the various services of the Saint Louis Hospital is a convincing proof of the sound foundations of our assertions.

p. 314. We would terminate this exposition with the question whether the use of an anti-gangrene serum might not be confused with that of the polyvalent serum; it is convenient to briefly recall the conditions.

Until lately, it was admitted as a classic notion that the gaseous gangrene of the surgeon, the malignant edema of Koch, the traumatic gangrene of the veterinary surgeon are due to the septic vibrio of Pasteur. Since, during the past 20 years, gaseous gangrenes of non-vibrio etiology have been found in widely separated instances, there is a tendency to consider these accidents as relatively exceptional.

In 1898 one of us showed that one obtains with animals immunized and treated with the virulent septic serous fluid from the vibrio, a serum endowed with absolute preventive properties with regard to experimental infections of susceptible species. The serum is, at the same time, antimicrobic and antitoxic; it neutralizes in vitro the septic toxin which in several instances kills the experimental animals when injected intravenously.

The well-known frequent complications of gaseous gangrene in war wounds constituted an indication for the use of a preventive serum, and in the last months of 1914, first at Bordeaux and then at Paris, several horses were immunized for the use of the Sanitary Service of the Army.

Various circumstances prevented the delivery of the serum and the delay enabled us to submit the producers of the serum to a treatment with B. perfringens, regarded as a frequent cause of gaseous gangrene.

On the other hand, the hypodermic use of a part of the polyvalent serum enables one to obtain a unique type by a combined treatment of the same producer with pyogenic and septic

agents; vibrio and perfringens. The totally different methods of immunization permit this dual object and experimental tests demonstrate that the superposition of the actions does not diminish either of them. (Note by Berg: The N. Y. City Board of Health have immunized one out of eleven horses to both tetanus and diphtheria at the same time, producing a serum with a high potency for both.)

It is therefore easy to prevent gaseous gangrene due to septique and perfringens (i. e., vibrio septique and B. perfringens).

p. 315. It is indispensable that the pathogenic microbes be phagocyted. For a long time we have been studying the conditions of phagocytosis of a microbe closely alled to V. septique, the bacterium of symptomatic anthrax, which certain bacteriologists have identified with the vibrio of Pasteur.

We have showed that for the bacillus of anthrax the phagocytic action is experimentally retarded by local traumata, notably the hemorrhages, by the association of the virus with inert particles, by the presence of foreign bodies and by the simultaneous presence of other microbes deprived of all pathogenic action.

The serum may, therefore, sometimes fail in the cases of V. septique and B. perfringens. On the other hand, the experimental prevention is so clearcut that its systematic use for the wounded seems indicated.

For preventive measures, the treatment has no inconveniences and is similar to the preventive treatment of tetanus. The passive immunity lasts for a few days only; hence it should be renewed as with tetanus serum until the cleaning of the infected wound is realized.

As a curative measure, the serotherapy is indicated in the beginning of infections as a complement to the various surgical and therapeutic measures.

The therapeutic action of the serotherapy is specific, and the limit of its efficiency is marked by the proportion—indeterminate at the actual hour—of the gangrenes due to V. septique and B. perfringens. But in such cases failure is to be expected, theoretically.

The systematic prevention of gaseous gangrene will be realized perhaps when one has determined the various etiological factors and the corresponding antibodies have been obtained.

The Polyvalent Serum in Veterinary Therapy: Leclainche and Vallée; Rev. Gén. Méd. Vét., Vol. 26, pp. 65-67, 1917.

A brief re-statement of the precautions necessary in the use of polyvalent serum and its limitations.

The Treatment of Wounds with the Polyvalent Serum of Leclainche and Vallée: Rev. Gén. Méd. Vét., Vol. 26, pp. 67-79, 1917, Guillaume and Bittner.

Grave cases which cannot be treated satisfactorily by antiseptics will yield to polyvalent serum. Clinical details are given of about 12 cases, which demonstrate, according to G and B, the superiority of the serum treatment over that with antiseptics.

Specific Serotherapy of Wounds and Pyogenic Infections. A. Guillaume and G. Bittner; Revue Générale de Médecine Vétérinaire; Vol. 28, pp. 113-136, 1919.

A continuation of these authors' previous work on the use of the polyvalent serum of Leclainche and Vallée in the local treatment of wounds. A number of important observations demonstrate rigorously the remarkable fidelity of the method and the rapid successes it has given in certain desperate cases.

The new series of observations include wounds of all kinds, in all regions and of all tissues, as well as several cases of generalized pyogenic infections. Twenty-nine cases are described, giving treatment, etc., with the polyvalent serum, as follows: fistulous withers; wounds of ligaments and tendons; wounds of joints, suppurating arthritis of the shoulder; street nail; cartilaginous quittor; "classic" ulcerous lymphangitis of Preisz-Nocard; infectious polyarthritis of colts, etc.

Among their conclusions the authors state that in the treatment of wounds nothing can compare with the serum treatment.

Dr. J. M. Smith, Baton Rouge, La., has been transferred by the Bureau to Birmingham, Ala.

Captain D. J. Meador has returned to Auburn, Ala., after being stationed at Camp Kearny, Calif., since January.

Dr. James A. Waugh, of Pittsburgh, Pa., has been offered and has accepted the chair of Surgery and Obstetrics in the Cincinnati Veterinary College.

ARMY VETERINARY SERVICE

FROM THE OFFICE OF THE SURGEON-GENERAL OF THE ARMY, WASHINGTON, D. C.

The following orders of transfer and reassignment have been issued for Veterinary officers during the past month:

1. Major J. R. Jeffers, V. C., U. S. A., from temporary duty in the office of the Surgeon-General to Fort Keogh, Mont., for duty as the Veterinarian.

2. Major Frank G. Hershberger, U. S. A. ,relieved from present duties and directed to report at Camp Upton, N. Y., for duty as the Camp Veterinarian.

3. Major Geo. A. Hanvey, Jr., U. S. A., from duty at Camp Upton, N. Y., to Washington, D. C., for temporary duty in the office of the Surgeon-General.

4. Major Andrew E. Donovan, U. S. A., from duty at Camp Dodge, Iowa, to Camp Grant, Ill., for duty as the Veterinarian.

5. Major Chas. H. Jewel, U. S. A., from duty at Camp Dix, N. J., to Washington, D. C., for temporary duty in the office of the Surgeon-General.

1. Captain J. L. Hartman, V. C., from duty at Chicago, Ill., to Manila, P. I., for duty in the Philippine Department.

2. Captain S. B. Ingram, V. C., from duty at Chicago, Ill., to Manila, P. I., for duty in the Philippine Department.

3. Captain Clarence Loveberry, V. C., is relieved from duty in the Philippine Department upon arrival of Captain Ingram and directed to report to San Francisco, Calif., and to the Adjutant General for instructions.

4. Captain J. R. Steffler, V. C., from Camp Dix, N. J., to Fort Oglethorpe, Ga., for duty as Post Veterinarian.

5. Captain H. Clarke, V. C., from Camp Upton, N. Y., to Washington, D. C., for temporary duty in the office of the Surgeon-General.

6. Captain J. F. Crosby, V. C., from Camp Grant, Ill., to West Point, Ky., for duty as Camp Veterinarian.

7. Captain E. P. O'Connell, V. C., from Camp Upton, N. Y., to Washington, D. C., for temporary duty in the office of the Surgeon-General.

8. Captain J. A. Weigen, V. C., from duty at Camp Dix, N. J., to A. R. D. No. 329, Camp Travis, Texas, for duty at that place.

9. Captain R. R. McComb, V. C., from Camp Devens, Mass., to Chicago, Ill., for a course in instruction in meat inspection.

10. Captain R. V. Vanskike, V. C., from A. R. D. Camp Sheridan, Ala., to Fort Oglethorpe, Ga., for duty as the Veterinarian.

11. Captain N. Neat, V. C., from Camp Lee., Va., to Chicago, Ill., for a course in instruction in meat inspection.

1. 1st Lieut. F. C. Waters, V. C., from Fort Oglethorpe, Ga., to A. R. D. No. 329, Camp Travis, Texas, for duty.

2. 1st Lieut. H. L. Williams, V. C., from Remount Depot, Fort Reno, Okla., to Camp Sherman, Ohio, for duty.

3. 1st Lieut, J. A. Rennie, V. C., from A. R. D. No. 328, Camp Bowie, Fort Worth, Texas, to Camp Courchesne, N. M., for duty with the 9th Engineers.

4. 1st Lieut. H. M. Savage, V. C., from Hoboken, N. J., to A. R. D. No. 304, Camp Meade, Md., for duty.

5. 1st Lieut. F. W. Lambert, V. C., from Camp Dix, N. J., to Camp Eagle Pass, Texas, for duty.

6. 1st Lieut. M. Sierveldt, Jr., V. C., from Chicago, Ill., to Camp Eustis, Lee Hall, Va., for duty as the Veterinarian.

7. 1st Lieut. F. B. Steinkolk, V. C., from Camp Dix, N. J., to Fort Sill, Okla., for duty as assistant to the Post Veterinarian.

8. 1st Lieut. C. J. Lambert, V. C., from Camp Dix, N. J., to Fort Huachuca, Ariz., for duty as assistant to the Post Veterinarian.

9. 1st Lieut. O. W. Howells, V. C., from his present duties at Fort D. A. Russell, Wyo., to duty as assistant to the Veterinarian at that place.

10. 1st Lieut. L. A. Marshall, V. C., from Camp Dix, N. J., to Camp Grant, Ill., for duty with the 6th Division.

11. 1st Lieut. F. W. Taylor, V. C., from Camp Dix, N. J., to El Paso, Texas, for duty with the 8th Engineers, Camp Baker.

12. 1st Lieut. F. H. Woodruff, V. C., from duty with the 8th Engineers, Camp Baker, Texas, to San Francisco, Calif., for transportation to Philippines for duty in the Philippine Department.

1. 2nd Lieut. H. W. Wise, V. C., from Chicago, Ill., to Port of embarkation, Hoboken, N. J., for duty.

2. 2nd Lieut. L. T. Eagle, V. C., from duty at Newport News, Va., to Charleston, S. C., for duty at the Port of Embarkation at that place.

3. 2nd Lieut. J. B. McNamara, V. C., from Camp Dix, N. J., to A. R. D. No. 323, Camp Funston, Kans., for duty.

4. 2nd Lieut. T. J. Riley, V. C., from Camp Dix, N. J., to A. R. D. No. 305, Camp Lee, Va., for duty.

5. 2nd Lieut. H. Leberson, V. C., from duty at Camp Jackson, S. C., to A. R. D. No. 329, Camp Travis, Texas, for duty.

6. 2nd Lieut. C. F. Wilson, V. C., from Camp Grant, Ill., to A. R. D. No. 322, Camp Dodge, Iowa, for duty.

The following officers have been honorably discharged from the Veterinary Corps, United States Army, during the past month:

LIEUTENANT-COLONELS.

1. H. E. Bemis
2. Reuben Hilty

MAJORS.

1. W. F. Guard
2. Walter G. White
3. John R. Scully
4. H. B. F. Jervis
5. Christian Wm. Greenlee

CAPTAINS.

1. H. L. Messmore
2. C. W. Likely
3. R. S. Sugg
4. W. C. Nickel
5. E. C. Jones
6. M. S. Esslinger
7. J. S. Spikes
8. F. M. Lee
9. J. L. Lindsay
10. Ora L. Campbell
11. L. R. Smith
12. Daniel J. Meador

FIRST LIEUTENANTS.

1. A. H. Schmidt
2. J. G. Bailey
3. Bernard Johnsen
4. H. J. Weaver
5. F. M. Hopper
6. W. A. Litton
7. R. Fenstermacher
8. E. L. Hannon
9. D. R. Duff
10. R. A. Branson
11. M. L. Nelson
12. J. L. Klotz
13. S. L. Pilgrim
14. E. B. Mount
15. J. L. Skiles
16. G. C. Armstrong
17. H. C. Wachs
18. A. X. Barr
19. W. G. Ellwitz
20. C. B. Shore
21. F. E. Hill
22. G. E. McEvers
23. J. O. Schlegel
24. C. J. Couchois
25. A. A. Leibold
26. E. O. Ericson
27. J. N. Campbell
28. S. W. Harrison
29. J. L. Hartranft
30. C. A. Collins
31. L. D. Potter
32. MacF. Campbell
33. E. A. Dowd
34. E. W. Youngblood

FIRST LIEUTENANTS—*Continued.*

35. G. W. King
36. M. E. Agnew
37. Odell Archer
38. Clive Daly
39. H. F. Nimphius
40. R. H. Schneider
41. G. W. Hunter
42. David M. Smith
43. J. H. Hewitt
44. H. C. Kutz
45. C. A. Beall
46. Nelson N. Lefler
47. Anthony V. Jandernoa
48. Redfield C. Mills
49. Alfred T. Baesxler
50. Wm. M. Thomson
51. Elmer Wm. Berg

SECOND LIEUTENANTS.

1. W. H. Hauer
2. H. B. Mitchell
3. C. P. Lunneen
4. G. L. Allen
5. H. P. Bonnikson
6. E. S. Ring
7. E. E. Lange
8. D. W. Nicholas
9. S. P. Bolstad
10. Wm. W. Yard
11. F. Low
12. R. W. Cates
13. P. F. Carr
14. C. M. Dee
15. E. A. Gilmore
16. H. W. Ayers
17. L. W. Ingram
18. J. N. Hunter
19. J. E. Gilfillan
20. W. R. Peeler
21. H. E. McLaren
22. H. J. Gohde
23. Max Danziger
24. P. B. Silvester
25. F. H. Schroer
26. D. W. Kennamer
27. S. M. Turner
28. H. G. Weigand
29. J. R. Kreger
30. W. C. Schultz
31. Loren Flora
32. R. A. Showalter
33. F. A. Burlington
34. R. C. Gilmore
35. D. B. Wilson
36. F. E. Kitchen
37. S. B. Watson
38. H. R. Hornbaker
39. H. K. McIntosh
40. F. C. Heninger
41. C. C. Neidig
42. W. U. Lemons
43. G. L. Schaefer
44. G. M. Parrish
45. L. E. Webster
46. E. L. Shuford, Jr.
47. C. Parker
48. J. H. Batsche
49. W. H. Lynch
50. Martin L. Walter
51. R. J. Poff
52. R. A. Devlin
53. R. L. Wolfe
54. Sherman L. Bratton
55. J. T. Quarll
56. Walter I. Wilkins
57. H. L. Armstrong
58. Glen R. Bach
59. Clark S. Burgett
60. George H. Elliott
61. Roy E. Selement
62. Samuel F. Lipton
63. Hugh D. Laird
64. Harry L. Cotton
65. Noel C. Elberson
66. George Wm. Clark
67. Lawrence B. Adams
68. John J. Wermuth

MAJOR JOSEPH R. JEFFERIS, U. S. A.

Major Joseph R. Jefferis, V. C., R. A., reported for temporary duty in the Veterinary Division, Surgeon General's Office,

Washington, D. C., June 21st, 1919. Upon completion of this duty he will take station at Fort Keogh Remount Depot, Montana, as the Veterinarian.

Major Jefferis sailed for France from Hoboken, N. J., August 7, 1917, and arrived at St. Nazaire August 20, 1917. He was assigned to duty commanding Veterinary Hospital at A. R. D., Base Section No. 1. On September 10, 1917, he was ordered to the Medical Supply Depot, Cosne, France, in charge of veterinary supplies till November 14th, when he returned to Veterinary Hospital at St. Nazaire as Commanding Officer. July 5th, 1918, transferred to Saint Aignon as Division Veterinarian, 41st Division. Was later transferred to 1st Replacement Depot as the Veterinarian. May 21st, 1919, was ordered to Le Mans to command Veterinary Hospital No. 11. Proceeded to Brest in charge of this organization and sailed from that port on S. S. President Grant, May 28th, 1919, arriving in Boston June 9th, 1919, and this hospital was demobilized at Camp Devens.

MAJOR WALTER G. WHITE, U. S. A.

Major Walter G. White, U. S. A., was honorably discharged from the Veterinary Corps, United States Army, at Washington, D. C., on June 27th, 1919.

Major White was first commissioned in the Veterinary Corps as a 2nd Lieutenant on June 28th, 1917, and reported at Camp Hancock, Ga., for active duty on August 24th, 1917, where he was assigned to the 109th Field Artillery, 28th Division. October 10th he was ordered to Auxiliary Remount Depot No. 308 as the Veterinarian, and while at that station was promoted to the rank of First Lieutenant. On January 16th, 1918, he was ordered to Camp Upton, Long Island, N. Y., to assist in organizing Veterinary Hospital No. 6 for overseas service. He was promoted to the grade of Captain, V. C., March 9th, 1918, and sailed for France with Veterinary Hospital No. 6 March 28th, 1918. Arriving France this organization was ordered to Neufchâteau for station. On September 18, 1918, Captain White was transferred to the 32nd Division as Division Veterinarian and served with this division in the Argonne offensive. The division was either on the front lines or immediate reserve from this time until the armistice was signed. After the armistice, the division formed part of the forces of the Army of Occupation and was stationed for some time in Germany. On December 22, 1918, Captain White was transferred as Division Veterinarian to the 2nd

Division, where he served until May 15th, 1919. Captain White was promoted to the grade of Major on May 3rd, 1919, and was transferred to the 90th Division on May 15th, returning with this division to the United States, and arriving in this country on June 7th, 1919.

Upon the demobilization of the division, Major White reported to the Veterinary Division, Surgeon-General's Office, for temporary duty and consultation prior to his discharge.

MAJOR BURT ENGLISH, U. S. A.

Major Burt English, U. S. A., who has just returned from overseas, was a recent visitor at the Veterinary Division, Surgeon-General's Office. As a Captain, Veterinary Corps, Regular Army, he was Division Veterinarian, 76th Division, where he organized the divisional veterinary service and sailed for France with this division on July 5th, 1918, arriving in Liverpool, England, July 12th, and in France July 15th, 1918. He was promoted to the grade of Major, Veterinary Corps, National Army, February 26th, 1918.

Upon arrival in France he was stationed with the division St. Amond, Montrond. On July 25th he was ordered for temporary duty at St. Aignon. August 10th ordered for temporary duty at Neufchâteau Veterinary Hospital No. 6. On August 25th he was assigned to duty with headquarters 6th Army Corps, which was being organized as a part of the First Field Army for duty in the offensive on the Toul front, and participated in the first drive of this corps in that sector (St. Mihiel drive).

In December the 6th Corps followed the Third Army northward to the border of Germany and took station in Southern Luxemburg. Major English remained as Corps Veterinarian until the corps was demobilized April 15th, 1919, when he was ordered to headquarters Third Army at Coblenz, Germany, as Corps Veterinarian, 4th Corps. He returned to the United States with the 4th Corps.

MAJOR GEORGE A. HANVEY, U. S. A.

Major George A. Hanvey, U. S. A., just returned from overseas service, has been ordered to the Veterinary Division, Surgeon-General's Office, for temporary duty.

Captain Hanvey was assigned as Division Veterinarian, 84th Division, stationed at Camp Taylor, Ky., on January 14th, 1918. He was promoted to the grade of Major, Veterinary Corps, Na-

tional Army, on February 20th, 1918. As Division Veterinarian he sailed for France on September 9th, 1918, and arrived in Liverpool, England, September 21st, 1918, and proceeded to Ramsey Rest Camp, England, where the division stayed three days, then crossed the English Channel from Southampton to Le Havre, France.

He remained with the 84th Division until November 8th, 1918, when he was transferred to the Advanced Veterinary Hospital No. 5 at Toul, France, as the Commanding Officer. On January 27th, 1919, he was transferred to the 88th Division as Division Veterinarian. On April 28th, 1919, he was again transferred to Veterinary Hospital No. 6 as Commanding Officer, and placed on temporary duty in the office of the Veterinarian, Advance Sector, S. O. S., until Veterinary Hospital No. 6 prepared to leave France for the United States. This organization sailed from Brest, France, on the U. S. S. Agamemnon June 10th, 1919, and arrived in Hoboken, N. J., June 18th, 1919. They then proceeded to Camp Upton, where the hospital was demobilized, on the completion of which Major Hanvey was transferred to the Surgeon-General's Office.

MAJOR D. H. UDALL, U. S. A.

Major D. H. Udall was commissioned Major, V. C., October 3, 1917, and reported for active duty on February 11th, 1918, at the M. O. T. C., Camp Greenleaf, Ga. After completing the course of training at this camp, he was assigned as Division Veterinarian, 86th Division, and reported at Camp Grant April 15th, 1918. Sailed from New York with the 86th Division on September 8th, arriving in Liverpool, England, September 23rd. Sailed from Southampton September 24th, arrived at Le Havre, France, on the 25th, and proceeded with the 86th Division to St. Nere de Cubzac, arriving on the 28th, where the 86th Division was stationed, where it was used as a replacement unit. On November 15th was transferred from the 86th Division to the First Depôt Division at St. Aignon. January 1st, 1919, relieved from this duty and ordered to report as Commanding Officer, 18th Veterinary Hospital, stationed at Souzi. February 8th, 1919, transferred to 7th Veterinary Hospital as Commanding Officer. February 14th, 1919, transferred to the A. E. F. University at Beaune for duty as instructor in Physiology, Veterinary Department. Ordered to Brest for transfer to the United States on June 8th, and sailed from that port on the S. S. Great Northern

June 30th, arriving in New York July 6th. July 11th reported for temporary duty in the office of the Surgeon-General, Veterinary Division, Washington, D. C., prior to being discharged from the service.

MAJOR GEO. B. M'KILLIP.

Major Geo. B. McKillip, U. S. A., was commissioned Major, V. C., December 11th, 1917, and reported for active duty on December 28th, when he reported for temporary duty in the office of the Surgeon General, Washington, D. C. December 28th to January 17th, 1918, took course of veterinary instruction at Washington, D. C. January 18, 1918, reported to Camp Upton, N. Y., as Commanding Officer, Veterinary Hospital No. 6, where this hospital was organized and trained prior to its transfer for overseas service. On March 27th, 1918, sailed from New York with Hospital No. 6 on the S. S. Olympic and landed at Brest, France, April 4th, 1918. April 4th to 7th the Hospital No. 6 was at the Rest Camp just outside of Brest. The Hospital No. 6 was then ordered to Neufchâteau, arriving at that station on April 11th. On September 12th relieved of command of Veterinary Hospital No. 6, Neufchâteau and assigned as assistant to the Chief Veterinarian of Base Section, Headquarters Bordeaux, Base Section No. 2. September 20th Headquarters Base Section was transferred to St. Nazaire. From September 21 to March 1, 1919, was assigned as Assistant Chief Veterinarian, Base Section, which was stationed at St. Nazaire. March 1st, 1919, relieved as Assistant Chief Veterinarian, Base Section No. 2, and ordered to Beaune, Côte d'Or, A. E. F. University, as Director of Veterinary Department of the College of Medicine, until June 17th, 1919. Relieved from this duty and ordered to report to St. Aignon for embarkation to United States. Left Brest on S. S. Great Northern June 30th and arrived in Hoboken July 6th, 1919. Was ordered to Camp Dix, N. J., for demobilization. Transferred to Washington, D. C., for temporary duty in the Veterinary Division, office of the Surgeon-General, upon completion of which duty he was discharged July 12th, 1919.

MAJOR HENRY W. PETER, U. S. A.

Major Henry W. Peter, U. S. A., joined the 38th Division, Camp Shelby, Miss., as Division Veterinarian, November 27th, 1917, and sailed with this division from Hoboken on October 2nd, 1918, arriving at Southampton, England, October 7th, 1918.

Sailed from that port October 11th, 1918, arriving at Le Havre, France, October 12th. Left Le Havre October 14th and arrived at Nantes training area with the 38th Division, where it was used as a replacement division. On November 11th was transferred from Nantes to St. Aignon for reassignment, and was assigned as Commanding Officer, Veterinary Hospital at Leux, Côte d'Or, arriving this station on November 27th, 1918. This hospital was in course of construction and when completed had acommodations for 200 animals, and the personnel consisted of Veterinary Hospitals No. 14 (white) and No. 21 (colored), and one labor battalion (colored). Remained in command of this hospital until May 27th, 1919, when both hospital units entrained for La-Mans preparatory to returning to the United States. On May 25th, 1919, was assigned as Commanding Officer No. 14 and sailed with this unit from Brest on the battleship Kansas June 16th, arriving at Newport News June 27th, where the hospital was demobilized. Upon demobilization of this unit Major Peter reported for temporary duty to the office of the Surgeon-General, Veterinary Division, Washington, D. C., preparatory to being reassigned to duty in the United States.

MAJOR WILLIAM F. GUARD, U. S. A.

Major William F. Guard, U. S. A., was honorably discharged from the Veterinary Corps, United States Army, at Washington, on June 25th, 1919. Major Guard was first commissioned as a 2nd Lieutenant, Veterinary Reserve Corps, on December 17th, 1917, and called to active duty January 28th, 1918. He reported at Camp Lee, Virginia, on February 1st, 1918; assigned to duty with Veterinary Hospital No. 3. On April 1st, 1918, he left Camp Lee with this hospital and sailed for France from Newport News, Virginia, on April 14th, 1918, arriving at St. Nazaire on June 1st, 1918. Upon arrival in France he proceeded to Camp Valdehon, where he remained on duty until September 12th, 1918. On this date he was relieved from duty with Veterinary Hospital No. 3 and ordered to duty in the office of the Chief Veterinarian at Headquarters Advance Section, S. O. S. On November 20th, 1918, he was relieved from duty in this office and ordered to Verdun (Meuse) for duty as the Commanding Officer of the veterinary hospital. On September 27th, 1918, he was promoted to the grade of Captain; promoted to the grade of Major on June 3, 1919. Relieved from duty at Veterinary Hospital and ordered to the United States May 23rd,

1919. Arrived in Hoboken, N. J., June 19th, 1919. Reported for temporary duty in the office of the Surgeon-General, and upon completion of this duty was discharged.

PROMOTIONS IN THE VETERINARY CORPS, AMERICAN EXPEDITIONARY FORCES.

The following Majors have been promoted to the grade of Lieutenant Colonel:

1. John H. Gould
2. Richard H. Power
3. Robert Vans Agnew

The following Captains have been promoted to the grade of Major:

1. Andrew E. Donovan
2. Herbert S. Williams
3. Wm. C. Van Alstyne

The following 1st Lieutenants have been promoted to the grade of Captain :

1. H. P. Gill
2. F. C. Sager
3. J. C. Johnson
4. L. R. Smith
5. O. E. McKim

The following 2nd Lieutenants have been promoted to the grade of 1st Lieutenant:

1. C. A. Beall
2. F. H. Steele
3. R. C. Coulson
4. J. J. Riordan
5. W. A. Litton
6. E. C. Cavanaugh
7. G. W. King
8. W. H. Boswell
9. J. M. Atterberry

The following Captains in the Veterinary Corps, retired, are promoted to the grade of Major on the retired list:

1. Alexander McDonald
2. Daniel LeMay
3. Walter R. Grutzman

The following officers have resigned from the Veterinary Corps, Regular Army, during the past month:

1. 2nd Lieut. Henry L. Sommer, V. C., who was on duty at Camp Lewis, Washington.

2. 2nd Lieut. Joseph W. Burby, V. C., who was on duty at Camp Gordon, Georgia.

OFFICERS, VETERINARY CORPS, UNITED STATES ARMY.

	On duty June 11, 1919.	On duty July 11, 1919.
Colonels	0	0
Lieutenant Colonels	5	6
Majors	74	68
Captains	193	182
1st Lieutenants	430	382
2nd Lieutenants	432	357
Total	1126	995

AD MISCEL

A FAREWELL BANQUET COMPLIMENTARY TO LIEUT. COL. L. A. MERILLAT.

The Journal is in receipt of the news from France that a farewell banquet was given to Lieut.-Col. Louis A. Merillat, V. C., of Chicago, by members of the faculty of the National School of Veterinary Medicine at Alfort, May 24th, 1919.

The banquet was held in the council chamber of the school, and many interesting talks were given. Some of the subjects dwelt upon were: The promotion of closer international relations in regard to Veterinary Science and Animal Husbandry; and the possibility of holding the International Veterinary Congress in the United States in the near future.

The following prominent members of the profession were present at the banquet: President Vallée; Professors Kaufman, Petit, Moussu, Dechampre, Cadiot, Coquet, Bourdelle, Railler, and many of the assistant professors. Mr. Pierre Blaziot, ex-member of the French Veterinary Mission of New York, and Capt. William D. Odou, V. C., U. S. A., liaison o......cer, Veterinary Corps, A. E. F.

Dr. Fred Low has received his discharge from the Army and is now located at Oakes, Iowa.

ASSOCIATION NEWS.

AMERICAN VETERINARY MEDICAL ASSOCIATION.

COMMITTEE ON LEGISLATION.
OFFICE OF THE SECRETARY.

185 NORTHWESTERN AVE., MILWAUKEE, WIS.,
June 21, 1919.

To the Officers and Members of all State, Divisional and District Associations, and Members-at-Large, N. A. of B. of A. I. V.:

GREETINGS:

An amendment to the Agricultural Appropriation Bill introduced in the U. S. Senate by Senator Walsh of Montana provides for an additional appropriation of $100,000 for the fiscal year beginning July 1st, 1919, to be used for Equine Meat Inspection. The amendment provides that any part of this appropriation not used for Equine Meat Inspection is to be applied to other Meat Inspection by the Bureau of Animal Industry.

The Committee on Legislation of the A. V. M. A. desires the coöperation of the B. A. I. Veterinarians in the achievement of this much-desired end. You are therefore earnestly urged to do your utmost in the effort to secure the enactment of this amendment. Act at once! There is no time to lose!

As this amendment is now being considered in conference, it is especially desirable that telegrams be sent to the following Members of Congress:

REPRESENTATIVES.

REPUBLICAN.	DEMOCRATIC
Gilbert N. Haugen, of Iowa, *Chairman.*	Asbury F. Lever, of S. Carolina.
James C. McLaughlin, of Michigan.	Gordon Lee, of Georgia.
Sydney Anderson, of Minnesota.	

SENATORS.

Carroll S. Page, of Vermont.	Thomas P. Gore, of Oklahoma.
George W. Norris, of Nebraska.	Ellison D. Smith, of South Carolina.
William S. Kenyon, of Iowa.	

Remember, it is the personal touch that counts. Urge prominent Live Stock Men and other influential friends of the above-mentioned Members of Congress to wire them urging their support of the Walsh Amendment.

Bills for refund of telegraph tolls in connection with the above should be forwarded direct to Dr. W. Horace Hoskins, chairman Committee on Legislation, A. V. M. A., 338 E. 26th Street, New York, N. Y., with copies of telegrams attached.

Fraternally yours,

S. J. Walkley,

Sec. to Committee on Legislation, A. V. M. A.

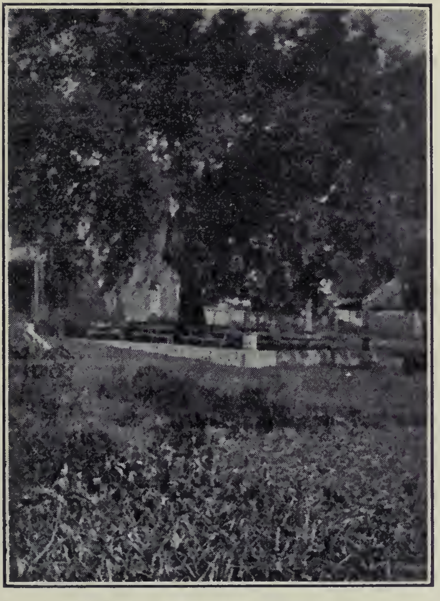
A FEW FACTS ABOUT LOUISIANA AND NEW ORLEANS.

New Orleans in 1719

The settlement of a French colony in Eastern Canada was the beginning of romance and tragedy in Louisiana, when in 1673 Pere Marquette and Louis Joliet received an inspiration from the Indians, who told them wonderful tales of a mighty river which flowed west from the Great Lakes to the Pacific Ocean, where the colonists could, ultimately, open up channels of trade with India. This was 131 years after the discovery of the "Father of Waters" by Ferdinand De Soto who, in his vain hunt for gold across the heart of the Gulf States, finally returned to Mississippi much depressed over his tragic fate. He fell sick with the fever and died, as he had lived, a daring leader. His body was deposited in the depths of the rolling Mississippi as a sacrifice to the wonderful country and natural drainage system he had discovered.

Louisiana experienced many gloomy days as the English, Spanish and French were eager to claim her as their own, at whatever cost it might be. However, the determined spirit of

the French predominated, and in 1718 Bienville, a gallant Frenchman who had been in America 19 years, was informed by an old squaw whom he found seated beneath a moss-covered oak, chanting revelations from the "Great Spirit," that the time would come when between the river and the lake (Pontchartrain) there would be as many houses of the white man as there were trees then.



Oak made historic in "Evangeline."

In 1755 the English drove the French from Acadia, now known as Nova Scotia, and history records it as "The Exile of the Acadians." Later Longfellow immortalized the tragedy and their final settlement in Louisiana along the Bayou Teche, Atchafalaya and Acadian shores in his beautiful story of Evangeline. Her name was originally Emeline la Biche, but owing to the particular sweetness of her character and gentle disposition she was no longer called Emeline but Evangeline, meaning "God's little angel." Longfellow traces her wanderings in search of her lover back to Philadelphia, and there says no more, but history asserts that she died in Louisiana, and was buried on the bank of the Teche under a gigantic oak which is now known as the Evangeline Oak, and if this is true, the writer has had the honor of standing beneath the oak and viewing the

country where almost one hundred and fifty years ago took place a happy reunion between the scattered Acadians.

Southwestern Louisiana is known as the land of the "cajuns," which is a corruption of the word Acadian, and their language, customs and superstitions have filtered into every parish in the State, and into a large number of counties in adjacent States. They are a simple-minded, prolific and home-loving people, and until only recently have many of their lives been touched by modern ideas. The land they own is measured in arpents, which is an old French calculation for land, and the term is recognized in all legal transfers of property. I believe an arpent originally was equivalent to an acre in English measure.

In the meantime Louisiana and the City of New Orleans lived happily under the French flag, but in about 1768 the Spanish took possession of the country and landed in New Orleans for the purpose of establishing a Creole* form of government. All went well until O'Reilly, an Irishman in the Spanish army, decided to execute the French leaders who fought the change. In October, 1769, five patriots were led to the Spanish barracks and shot, thus becoming the first Louisianians to give their blood for the cause of freedom.

O'Reilly endeavored to place the colony under just laws, and erected a court called the Cabildo, which was the seat of government for the Superior Council, and combined many of the powers of the Supreme Court with the present Legislature. New Orleans now had a population of a little more than 3,100, including negroes. The city and country flourished and the people became a mixed race, notably French, Spanish and American.

In 1781, the year Cornwallis surrendered to Washington at Yorktown, Va., Galvez, a daring young Spanish Governor of Louisiana, won a brilliant victory over the English at Pensacola, Florida, as he had previously done at Natchez, Miss., and Baton Rouge, La. This virtually settled the American Revolution, but left Louisiana under Spanish rule. However, the people prospered and a few years later appeared the first newspaper in the State, called the Le Moniteur de la Louisiane. In 1795 the indigo crop failed on acount of an insect, but this made way for the first adventure in raising sugar cane, which has proven to be such a splendid success.

* A French Creole in Louisiana is a native descended from French ancestors who had settled in the State. Some of the most prominent white families in Louisiana are, therefore, Creoles.

In 1800, through a secret treaty negotiated by Napoleon, Louisiana was ceded by Spain back to France. The transaction was kept a secret for a year on account of the strained relations between England and France. After the facts became known, the United States Government objected to such a powerful man as Napoleon holding so much territory in America and commenced to lay plans whereby there could be purchased from France the Island of New Orleans and the Florida country. Finally two great Americans, Robert R. Livingston and James

FAMOUS JACKSON SQUARE, NEW ORLEANS.
Showing old Spanish Cabildo and St. Louis Cathedral in background.

Monroe, went to France, and after much discussion, bought all of Louisiana from the Mississippi to the Rocky Mountains for fifteen million dollars. The papers were signed April 30, 1803. Congress approved the treaty, but with the understanding that the territory should be divided into two parts, one to be called the District of Louisiana and the other the Orleans territory. In 1804 President Jefferson appointed Claiborne the first Governor of the present State, and in the meantime New Orleans had grown to 10,000 population, while it was shipping millions of dol-

lars' worth of cotton, sugar, molasses and tobacco. The city streets were not well kept and were poorly lighted. The people preferred to lavish their pride on their houses, which were built with large high rooms, broad halls and wide galleries. The life of the Creole was happy and gay, and the city was unusual in this distinction. The people were prosperous, and the plantation owners always extended a glad hand to the wayfarer, inviting him to tarry as long as he liked, for food was a-plenty.

The next great move, which finally resulted in much grief, was the importation of slaves to work in the cotton and cane. Later, in 1812, after Louisiana had a population of 60,000, Congress, after a long, spirited debate, whether or not the Creoles, a mixed race, could be true to any other country but Spain or France, admitted it to the Union.

In the meantime the Baratarian pirates, who lived on two small islands on the southern coast of Louisiana, were terrorizing the city of New Orleans, robbing vessels and smuggling into the State goods on which they had never paid a revenue tax. The Governor of the State offered a reward of $500 for the head of the leader, and he in turn became angry and filed a counter offer of $500 for Governor Claiborne's head. The Baratarians were so bold and well fortified that no one dared make a claim for the reward. Therefore the leader went about unmolested. The Chief Executive asked the Legislature to put a stop to these unlawful activities, but they lacked the courage and the finances to proceed against 500 outlaws. Captain Jean Lafitte was the leader of the Baratarians, yet he possessed a number of unusually good qualifications which were later recognized by General Andrew Jackson, who reached New Orleans December 1, 1814, for the purpose of fortifying the city and defending it against attacks from the British. The people had little confidence in Jackson, as he was a strenuous character from the west, and did not appear to have the polish and training of the British leaders. However, he proceeded to organize his troops, which were a mixture of Louisiana, Mississippi, Kentucky and Tennessee soldiers, with Baratarians, Indians and negroes, and on the 8th of January, 1815, the battle of New Orleans was won. This was a brilliant victory, but it had its regrets, inasmuch as it was fought the day after peace was declared between America and England. Following the battle the people of New Orleans went wild with enthusiasm, which was a splendid tribute to the military genius

of General Jackson. Notwithstanding the honor the people paid him, the Legislature passed a resolution thanking other heroes in the conflict, but purposely omitted Jackson because he had dared to usurp the power of State rights by placing the city of New Orleans under martial law, and for that he was brought before the court and fined $1,000. He paid the fine and admonished every citizen to forever obey the law. The rebuke was not overlooked, as Congress, some years later, refunded the fine with interest, which amounted to about $30,000.

Sky line, City of New Orleans, from the Mississippi River.

Following the victory the people became united, Louisiana was saved, and the Creoles and Americans were joined in a common cause. From the time the first Governor was appointed there appear both Creole and American names in the long list of Governors between 1816 and the present time. Louisiana prospered, settlers came in and tilled the soil. Plantations were started which raised cotton, cane and tobacco. Schools, churches and villages were built. In 1830 the first railroad was constructed from New Orleans to Milneburg on the south shore of Lake Pontchartrain. Levees were built, but they were inadequate and the drainage and water system paved the way for

grief. In 1853 occurred a great yellow fever epidemic, following the arrival of a vessel from Rio de Janeiro, which bore several infected immigrants who took sick and died. The fever spread. Many people left for the North, and those who remained awaited their fate. The first week in August nine hundred and forty-seven deaths were recorded, and on the 22nd of the same month the fever was at its peak when two hundred and eighty-three died in one day. In the meantime medical science had not discovered the cause, but a few careful observers had noticed that the negroes suffered much less from the attacks. The colored population lived amid very unsanitary conditions, in unprotected cabins frequently surrounded by pools of stagnant water. These conditions exposed them more directly to the mosquito, and to make themselves more comfortable, every night they would burn a mass of old rags which produced a smudge of dense smoke sufficient to protect them from the mosquito. Later, when it was discovered that a certain species of mosquito transmitted yellow fever the apparent immunity enjoyed by the negro was fully understood. New Orleans emerged from the epidemic more determined and stronger than ever to fight difficulties. Rigid quarantines were instituted. Gigantic levees erected, cisterns relegated to the junk heap, and a perfect water system established, so that today yellow fever, in the minds of the younger generation, is ancient history, and the city employs the use of the most sanitary equipment.

The next great conflict was the war between the States, and New Orleans and Louisiana had its share of the sorrow, as the mouth of the Mississippi was a contested point between the two armies, since in the control of the "Father of Waters" would lie a strategic feature of untold military value. On April 19, 1862, Admiral Farragut, in command of the Federal fleet, finally broke through and steamed up the river past New Orleans.

From the early days, when the French, English and Spanish were claiming Louisiana, up to the close of the Civil War, the people of the Pelican State had a stormy time. They experienced many joys and sorrows, but never faltered nor abandoned the cause of ultimately establishing a permanent State. Today the Commonwealth and the city is one of prosperity and contentment. The city of New Orleans, with a population of over 400,000, in the southeast corner of the State, and Shreveport, with a population of 35,000, in the northwest corner,

are both splendid monuments of industry which are significant of pride and diligence. Schools and churches cover the land and the educational system is making some remarkable improvements. Tulane University (New Orleans) and the Louisiana State University (Baton Rouge) are two well-equipped institutions which should command attention from those who are seeking the best educational facilities. Louisiana offers unusual attractions to the homeseeker, commercial and professional man. The people are richly endowed with the spirit of good old Southern hospitality and are quick to recognize quality.

Gibson Hall, Tulane University, New Orleans.

For months you have been hearing the call to come to the Crescent City November 17 to 21 inclusive, and for the next three months you will hear the invitation repeated, and the appeal frequently emphasized. Do not overlook this great occasion to see an interesting feature of our country, as that and the Association will broaden our scope of vision, and make us glad that we are privileged to grasp such a magnificent opportunity.

E. I. Smith,

Sec.-Treas., Committee on Arrangements, L. V. M. A.

COMMITTEE ON LEGISLATION.

The passage of the Agricultural appropriation bill marks two achievements for the profession. The increased pay of those who have heretofore received twenty-five hundreds of dollars or less annually, and the first step toward a fixed increase of those who have heretofore had a minimum salary of $1400 to $2000.

The securing of the reëstablishment of Equine Meat Inspection and an appropriation of one hundred thousand dollars that may be used for this purpose will help solve an economic problem of world-wide importance.

W. Horace Hoskins, *Chairman.*

NEW YORK STATE VETERINARY COLLEGE, NEW YORK UNIVERSITY.

The following list of graduates received their diplomas at the commencement exercises on June 11th, 1919, at the New York State Veterinary College, New York University:

Abramson, Alexander H., 444 Grand street, New York City.

Benson, Clarence O., Wassaic, N. Y.

Carabba, Victor, 178 Mulberry street, New York City.

Felder, Morris, 142 Manhattan avenue, Brooklyn, N. Y.

Koslow, Louis, 1766 Prospect place, Brooklyn, N. Y.

Kreindler, David A., 2750 West 17th street, Coney Island, N. Y.

Lebish, Jacob, 293 Henry street, New York City.

Spevack, Victor, 43 Nostrand avenue, Brooklyn N. Y.

Wright, James M., Somerville, Mass.

The Following prizes were awarded: Faculty Gold Medal, Victor Carabba; Alumni Prize, Jacob Lebish; Lt. W. W. Yard Prize (1st), David A. Kreindler; Lt. W. W. Yard Prize (2nd), Victor Spevack; Prize in Therapeutics, Victor Carabba; Prize in Canine Surgery, Victor Carabba.

The fourth-year curriculum will be in force for the year 1919-20.

Henry Henning, *Secretary, Faculty.*

Captain Joseph F. Crosby was transferred in July from Camp Grant, Ill., to Camp Knox, West Point, Ky.

OTHER ASSOCIATIONS

COLORADO VETERINARY MEDICAL ASSOCIATION.

The seventeenth semi-annual meeting of the Colorado Veterinary Medical Association, held at Fort Collins on June 5 and 6, was well attended and proved of unusual interest.

The committee appointed to study the question of a uniform price for the administration of biologic preparations reported progress but was unable to make a definite recommendation.

Dr. Charles G. Lamb, chairman of the Committee on Legislation, reported that all of the bills recommended by the Association at its winter meeting failed of passage in the Legislature. He explained the amendments which were made to the stallion bill so that the veterinarians might be informed on making examination for soundness.

Three new members were added to the roll, as follows: Wm. H. Feldman, John A. Bestall and Charles A. McKim.

The president's address, by Dr. H. E. Kingman, called attention to the need of better preparation and organization for putting through necessary legislation, and also dealt with the possibility of making the college more useful to the profession by increasing the facilities for laboratory diagnosis and by the addition of a summer school.

Lieut. H. G. Wiegand, who had spent nearly two years in France, related his experiences as an army veterinarian in that country.

Major Wallace M. Decker, who had just returned from France, was called upon, and in a few extemporaneous remarks told of the conditions as he found them in the army.

The question of "Cæsarian Section in Sows" was well discussed by Dr. N. J. Miller, who was followed by Dr. A. A. Hermann on the same subject. Dr. Miller finds that cæsarian section is not only frequently desirable, but in a large percentage of cases both the mother and the young may be saved.

Dr. A. W. French read a paper on "Sheep Diseases," in which he discussed more especially necrobacillosis, scab and pneumonia.

Dr. C. E. Salsbery, of Kansas City, read a paper on "Diseases of Fowls," which he said were becoming of great importance to veterinarians, owing not only to the prevalence of disease in this

species, but also to the value of the poultry industry. He discussed particularly cholera, white diarrhœa and tuberculosis. He stated that vaccination against cholera with the killed organism was proving of value in the hands of many, and was becoming a standard procedure.

Dr. A. T. Kinsley, of Kansas City, discussed the question of "Contagious Abortion in Cattle," which created much comment and called forth many questions.

Case reports were given by Drs. R. H. Bird and G. H. Glover.

The high point in the clinic was reached in a demonstration on a number of sterile cows, conducted by Dr. George F. Jungerman, of Hiawatha, Kansas. Dr. Jungerman not only demonstrated the actual condition in many of the animals, but ably discussed his method of handling such cases. There was also a demonstration of diseased generative organs from both cattle and hogs selected at the packing houses in Denver and shipped up for the meeting.

Many other interesting cases were presented for diagnosis and operation.

The entertainment provided for the ladies consisted of a tea given at the home of Mrs. R. F. Bourne on the afternoon of the first day and a banquet and ball in the evening.

I. E. Newsom, *Secretary.*

NEW JERSEY SCHOLARSHIP.*

By William Herbert Lowe, Paterson, N. J.

As the thought of a New Jersey Scholarship first came to my mind it seemed like a dream, impossible of realization, but suddenly there appeared before me the Coat of Arms of New Jersey, the plows and the horse's head, with the motto, "Liberty and Prosperity." As I started out for the Scholarship a mental vision of our Coat of Arms was ever before me. Let us think of the picture for a moment.

The interpretation of the plows and the horse's head were to me convincing proof that the early settlers of New Jersey, the colony as you know, was one of the original thirteen colonies that formed the United States of America, unquestionably realized the fundamental importance of agriculture and animal husban-

* An address delivered June 10, 1919, before the Alumni Association, New York State Veterinary College, New York University.

dry, the basis upon which veterinary science is founded, for there can be no successful agriculture without animal husbandry, and animal husbandry cannot attain its highest and most efficient state of development and preservation unless the laws of life — vegetable and animal — are diligently studied and the vital principles governing the same intelligently applied in the cultivation of the soil and in the propagation, development and maintenance of all classes of animals in a state of domestication.

The application of science to agriculture and animal husbandry is making for results that spell a greater "Liberty and Prosperity" than the world has ever known. The treatment of animal diseases will be the least part of the work of the veterinarian in the years to come. The greatest field for his labors is in the development and management of an animal husbandry under conditions that will not invite infection, disease and unnecessary loss. An economic veterinary science that will at the same time protect the health and safeguard the lives of the human population from infection and infestation of animal origin.

The people of New Jersey are progressive and patriotic. In agriculture, in education, in science, in invention, in manufacture and in commerce her people have always occupied a prominent position, and is it any wonder that the veterinary profession of that State should blaze the way for the establishment of the first State Veterinary Scholarship in America? I think not. How could they do less and be true to her time-honored traditions?

New Jersey has produced some of the greatest minds, and there also seems to be an attraction within her borders for those born elsewhere.

New Jersey was the birthplace of that eminent veterinarian and sanitarian, Daniel E. Salmon, the man who founded at Washington what has become the greatest veterinary and animal bureau in the world, and was its chief for twenty-one years. It is interesting to note that the organization of this bureau occurred in 1884, the same year as the V. M. A. of New Jersey was organized.

Salmon's knowledge of the geographic, railroad and other advantages of the state led the national government to locate the largest and most important animal quarantine station of this country temporarily at Garfield, and permanently at

Athenia, which is within a three-mile drive of my home and about twelve miles from the college.

This is the quarantine station where imported cattle, sheep, swine and other livestock arriving at the port of New York from all parts of the world are held in quarantine before being released for shipment to points of destination throughout the length and breadth of this broad land. The livestock arriving at this quarantine station are mostly breeding animals of the choicest blood and the finest pedigree.

It is hardly necessary in this presence to mention that New Jersey furnished New York University with its second chancellor in the distinguished personage of Theodore Frelinghuysen, who was born at Millstone, Somerset County, N. J., March 28, 1787.

That eminent educator and statesman held many important positions in his state and in the nation, including that of Attorney General of New Jersey, United States Senator, and President of Rutgers College.

My home town, Paterson, I am proud to say, gave Nicholas Murray Butler to Columbia University.

The home of the late John Payne Lowe, agriculturist, editor and trustee of the Veterinary College, pioneer in the cause of veterinary education in America, was situated on the banks of the picturesque Passaic, at Little Falls, N. J., of fond recollection to the speaker.

New Jersey was represented at the initial meeting of the U. S. V. M. A., now the A. V. M. A., at the Astor House, New York City, in 1863, and has the distinction of furnishing two presidents to this great organization, both alumni of the A. V. C., now a corporate part of New York University!

The delightful home of Thomas A. Edison is at Llewellyn Park, N. J., but the distinguished electrician spends much of his time in his workshop at West Orange.

Grover Cleveland, born at Caldwell, N. J., is buried at Princeton, and I might add that the present occupant of the White House, *or rather the present President of the United States*, hails from Princeton. These are a few of the men whose works make for "Liberty and Prosperity."

Fellow colleagues, if I am not greatly mistaken, it is such a liberty and such a prosperity that America and the whole world is crying out for today, and let me say that as the fundamental

importance of veterinary science is better understood by the public and its teachings more generally heeded will an enduring and satisfying peace be established throughout the world.

There can be no better evidence of the veterinarian's vision and unselfish love for his profession than the creation by the veterinary alumni of a Scholarship fund.

It seems very fitting and proper that the New Jersey Scholarship should be established in New York University, the great university that has assumed the responsibility of fostering American veterinary education in the cradle of its birth.

It is my very great pleasure to be able to announce at this time the creation of a New Jersey Scholarship fund of $10,000 in New York University, but let it not be assumed that this establishment is made solely by the veterinary alumni of New York University, for such is not the case. The New Jersey movement is a far bigger and broader one than that of any college or university. It has the support of alumni of the Ontario Veterinary College in Canada and the Royal College of Veterinary Surgeons of London, England, as well as of the foremost veterinary schools of the United States. A more devoted and loyal body of men does not exist in any profession, in any state or nation. "Perstare et Præstare," persevere and excel.

Veterinary education means science applied to agricultural pursuits, to animal husbandry, to animal industry; it means the production and conservation of food and clothing for mankind; it means the safeguarding of the human family from disease of animal origin; it means a well-fed people, a healthy people, and a happy people; it means "Liberty and Prosperity."

ASSOCIATION OF STATE AND PROVINCIAL VETERINARY COLLEGES.

REPORT OF THE COMMITTEE ON THE METHOD OF TEACHING OBSTETRICS AND DISEASES OF THE GENITALIA.

Throughout the history of veterinary education, obstetrics and the diseases of the genitalia have been poorly taught — probably the most poorly taught of any subjects in the veterinary curriculum. There are several reasons for inefficiency. In the first place, most veterinary schools have been located in great

cities, where obstetrics and the diseases of the genital organs play a minor rôle. The general location of the schools in cities has operated to defeat efficient teaching in this field in two ways. In the first place, it has naturally and generally led to the selectiton of a teacher who has had little or no clinical experience with either obstetrics or the diseases of the genital organs. In some cases it has been attempted to overcome this defect by selecting as teacher of obstetrics a veterinarian engaged in country practice, who shall visit the veterinary college at stated intervals in order to give instruction. Evidently this cannot overcome the defect, because the surroundings inevitably make the teaching secondary and the private practice primary. The second cause of inefficient teaching in this field is that in city colleges clinical material for illustrative purposes is not available.

Under these conditions, it is only natural that the teaching of veterinary obstetrics should be very poorly done, as compared with the other branches of the veterinary curriculum. This is very unfortunate, because veterinary obstetrics and the diseases of the genital organs stand at the threshold of all successful animal husbandry and dairying, in which the regular physiologic reproduction of vigorous young is the first essential.

When the literature upon veterinary obstetrics and the diseases of the genital organs is examined carefully, it is found to be scanty, poor in character, and poorly arranged. In the various textbooks upon veterinary obstetrics, few efforts have been made to present the subject in a thoroughly scientific and practical manner. Rather, it is presented as a sort of hodgepodge and jumble of fact, fiction, and conclusion, largely devoid of foundation or correlation. The literature upon the diseases of the genital organs is even worse. By searching here, there, and everywhere one may find mentioned quite a list of diseases of the genital organs. Some of them are found in textbooks upon surgery, others in books on obstetrics, and yet others in works upon medicine. Even in these various groups of literature, the diseases of the genital organs are, with a single exception, not brought together, but scattered here and there, so that the veterinary student has no conception whatever of the diseases of the genital organs as a whole, and has no adequate opportunity in our literature to study them clearly and satisfactorily.

An interesting commentary upon the status of the teaching of obstetrics and the diseases of the genital organs is that the ma-

jority of veterinary students are not seriously urged to procure and study any textbook upon the subject. The state schools of America have, as a class, stood apart from the private schools in teaching from textbooks wherever they are available. In some state schools, however, no text is used in veterinary obsterics. No adequate text exists upon the diseases of the genital organs. Amongst veterinary teachers there has been much difference of opinion regarding the value of textbooks. Taking all the schools together, the prevailing opinion has been that textbooks have but a minor value, especially in the field under discussion. This attitude leads to two serious results in teaching:

1. The student has no secure anchorage upon which to base his studies.

2. The student is taught to disregard the value of veterinary literature, whether upon obstetrics or upon other subjects, and whether standard or current. This attitude is perhaps largely responsible for the very meager libraries of many veterinarians.

The attitude of many teachers of veterinary obstetrics upon the question of a textbook has perhaps been more deplorable than a similar attitude in any other field. Essentially, as I understand them, some teachers of veterinary obstetrics claim that the classroom work is of very scant or no value; that there are no such things as scientific principles in veterinary obstetrics, and that a veterinary obstetrist must finally grow up as a result of his actual experience in the field. In other words, they aver that obstetrics is not teachable by an instructor and can be learned by the student only when out in actual practice. This attitude has always constituted a serious reflection upon instruction in veterinary schools. The position should be that every field of knowledge in veterinary science should be brought before the student in the school, in such a manner that upon graduation he shall be able to apply practically and safely his knowledge in every branch of the work.

Scientific veterinary obstetrics can no more be readily learned by the practitioner in the field, without adequate college training, than anatomy, physiology, surgery, or any other subject. The only way by which veterinary obstetrics can be divorced from quackery is through the medium of adequate scientific college teaching. For this purpose, there are certain fundamentals which should always be kept in mind. In order to teach a subject, there must be the teacher, the student, the equipment, and the material.

The teacher of obstetrics and the diseases of the genital organs must have a thorough scientic conception of the subject. Not only must he know all the fundamental subjects, such as anatomy, physiology, embryology, pathology, and bacteriology, but he must know thoroughly all the forces in parturition and must have had practical experience with animals in both normal and abnormal birth.

The student needs to be well equipped for his work before being admitted to the class in obstetrics. His knowledge of the anatomy of the genital organs should be very thorough. Dr. Dykstra of this committee emphasizes this as an absolute essential. It is discouraging to note that the anatomy of the genital organs of the domestic animals is very poorly taught. As a matter of fact, the descriptions of the genital organs of domestic animals in textbooks upon anatomy are exceedingly crude and loaded with omissions and errors. The defectiveness of literature upon the anatomy of the genital organs might be illustrated by the statement that, until very recently, there did not exist in any veterinary anatomy an illustration of the internal generative organs of the cow of such a character that the organs themselves could be identified by comparing them with the illustrations. Neither does any textbook on anatomy show that the preputial sac of the ruminant and porcine male does not exist at the time of birth, but develops with the advent of puberty. Such errors and omissions might be extended almost indefinitely.

The student should be given a regular course in anatomy, as a part of the general subject. One of the great difficulties which confronts the teacher of anatomy and the teacher of obstetrics is that the genital organs which come to him in the ordinary course of his work are quite largely pathologic. This is especially true of the cow, where perhaps more than in any other animal the anatomy of the genital organs is of great importance. Cows with healthy genital organs do not as a rule find their way to the anatomical laboratory. The teacher of veterinary anatomy and of veterinary obstetrics should consequently seek material from reliable sources for his teaching work. This is best done by visiting the abattoir and securing the genital organs from young animals and from animals which are pregnant, and comparing these with organs which are evidently pathologic.

The veterinary anatomist naturally teaches regarding the form, structure, consistence, and volume of the dead organs. The obstetrist is not interested in the dead organ, except because

it furnishes a basis for understanding the live organ. The obstetrist desires to show the student what the organ is like in a living healthy animal, where it is located, what its consistency is, and its relationship to other organs. For this purpose, he needs have typically healthy genital organs from the abattoir in order that he may show the student in the classroom all that is possible regarding the organ. Later he needs to supplement this knowledge by having the student palpate the organs in living, healthy animals, and in diseased animals.

There are certain fundamental principles in obstetrics which can be taught in the laboratory better than in the clinic. For instance, there are certain principles to be brought out in connection with dystocia, especially with reference to mutation and embryotomy, which are best taught by means of the apparatus which we have come to designate a phantom. It does not need to be elaborate. Almost any sort of box, in crude imitation of an abdominal cavity and genital tract will answer the purpose. With this the student may manipulate a dead fetus, learn the various mutations, and especially get clearly the fundamental principles of embryotomy. In my experience as a teacher of obstetrics I believe that, for the labor required, the laboratory exercises upon embryotomy conducted upon freshly killed newborn calves placed in the phantom have been the most valuable part of the obstetric teaching. Upon this point Dr. Dykstra is in perfect harmony with your chairman, and states: "Throughout the teaching of the entire subject, laboratory instruction is of first importance." He admits freely, however, that he can not duplicate the actual difficulties met in practice and that the work is not complete without actual clinical instruction in obstetrics.

A thorough knowledge of embryology is absolutely essential to a scientific understanding of obstetrics. Many cases of dystocia are due primarily to some aberration in the development of the fetus. The diseases of the fetus cannot be understood until the student has a thorough knowledge of the physiology of the fetus. It is essential, also, to an understanding of the diseases of the genital organs that embryology should be thoroughly studied. For example, one can not comprehend retained placenta unless he knows the structure and the physiology of the healthy placenta of both mother and fetus.

The student must understand very thoroughly also the physiology of the genital organs. He must know the physiologic func-

tions of the ovaries, must understand the influence upon the nerve centers of the ovisac and of the corpus luteum, and must know, so far as can at present be known, the physiology of every part of the genital tract. At present there is a great deal of confused immature enthusiasm regarding the diseases of the genital organs of cattle, where veterinarians are rushing in, assuming that they may render a remarkable service, when they do not know a corpus luteum from a cyst and have no comprehension of the physiology and pathology of either corpus luteum or cyst, or of the ovary as a whole. It should be very clear that a knowledge of the physiology of the entire genital system is the first essential in dealing with these diseases.

The final teaching of obstetrics and the diseases of the genitalia must be conducted in the clinic. The student must be taught upon suitable animals how to palpate the internal genital organs, and by that palpation determine whether they are healthy or diseased, whether the animal is pregnant or non-pregnant, and any other details necessary for a proper diagnosis and prognosis. This palpation and diagnosis should be made upon both healthy and diseased animals. Following, or at the same time, the student needs to have actual observation and experience in dystocia and in the handling of the disease of the genital organs. In the New York State Veterinary College, at Cornell University, I urged for a long time — and there was finally established — an extensive ambulatory or out-clinic, which has been instrumental in making available annually in our clinical work hundreds of cases of diseases of the genital organs and of dystocia. It has proven the most valuable surgical work the college has performed. It has a double value. First — and I have always thought the most important — is the fact that it keeps the teachers in constant touch with the work and familiar with the various plans of handling the difficulties met. I have always held that a clinic is quite as essential for the teacher as it is for the student — that a teacher without constant clinical experience has no business in the classroom for the teaching of clinical subjects. I have also held that this clinic should be a college clinic — not the private practice of the teacher. The animals should be under the teacher's care, in such a way that he can get the greatest possible amount of information regarding the character of the disease for himself, in order that he may make use of it in teaching. The clinic is also essential for student instruction. If it is de-

sired to teach the student regarding the douching of the uterus for chronic endometritis, far more can be taught in one hour of actual clinical work upon the diseased uterus than in any number of hours of theoretical teaching. There are certain principles which can be laid before the student in the classroom, but there are certain applications of these principles which can be taught only in the clinic. The physical aspect and the diagnosis of cervicitis may be taught in outline in the classroom, but they can not be truly well taught except by showing the cervicitis thoroughly in the clinic. The same rule holds in teaching the handling of dystocia. There is no place where it can be taught as effectively as in the clinic. It is unnecessary to demonstrate every possible manipulation. That is impossible in any clinic. However, if the teacher understands the matter of instructing, he can demonstrate the application of all the chief principles of obstetrics with a comparatively small number of cases. No two cases of difficult labor are the same, but there are certain fundamental principles running through all, or nearly all of them which, if the teacher has the proper initiative, can be clearly shown to the student. For example, in extending a retained anterior limb, the principles involved in the mutation may be thoroughly demonstrated clinically with a retained posterior limb, in posterior presentation, but it is necessary that the principle should be demonstrated thoroughly to the student, and the teacher needs one of the two complications in order that he may give the student the best instruction possible.

How the teacher of obstetrics and genital diseases in a city college may offer appropriate instruction to his students is a very complex and embarrassing problem. It has largely been solved by fiction — or perhaps the meaning could be more aptly expressed by the new word *camouflage.* The school has made statements in its announcement intended to lead people to believe that it conducts adequate clinics in obstetrics and the diseases of the genital organs.

The subject of obstetrics and diseases of the genitalia is constantly growing in importance. The expense of keeping breeding females and keeping their young up to efficient age increases each year. The dairying industry is undergoing a critical readjustment. It is highly essential that unusually efficient dairying animals shall breed suceessfully and regularly, so that the reproduction of valuable stock shall be strengthened and the repro-

duction of poor stock be rendered unnecessary. The keynote to such advancement lies in a better understanding of the genital diseases by veterinary practitioners. This better education must be supplied by the veterinary colleges.

The question is a serious one. Each veterinary college is under profound obligations to furnish education of a high order in this field. It must furnish the capable teacher adequate equipment and abundant clinical material. If a given college can not offer such education, it should provide some means whereby its students may procure it at another institution, either as undergraduate or as post-graduate work.

Every practitioner amongst breeding animals should have thorough education in this field, and a candidate for license ought not be admitted to practice except he can show that he has had ample opportunity to learn the subject — that the college has supplied competent teachers, adequate equipment, and abundant clinic. A mere perfunctory written answer on obstetric questions should not be accepted, unless the examining board knows that the candidate has had the proper opportunity actually to learn the subject in the clinic.

R. R. Dykstra.
C. H. Covault.

OKLAHOMA STATE VETERINARY MEDICAL ASSOCIATION.

The Oklahoma State Veterinary Medical Association met at the Lee-Huckins Hotel June 30 and July 1. About 75 veterinarians were in attendance and an excellent meeting was held. The principal papers offered were as follows: "How Federal Activities Affect the Local Veterinarians," by D. M. Campbell, Chicago, Ill.; "Hemorrhagic Septicemia in Central Oklahoma," by W. H. Martin, El Reno, Okla.; "Diagnosis and Treatment of Swine Diseases," by A. T. Kinsley, Kansas City, Mo.; "Meat and Live Stock Situation of the World," by R. F. Eagle, Chicago, Ill.; "Formaldehyde and Its Uses in Veterinary Medicine," by R. C. Moore, St. Joseph, Mo.; "Inspections for Interstate Shipment of Live Stock," by J. S. Grove, Oklahoma City, Okla.; "Tuberculosis Law, Interpretation and Application," by E. V. Robnett, Oklahoma City, Okla.

The semi-annual banquet was held at the Lee-Huckins Hotel on the evening of June 30th, with Dr. A. T. Kinsley as toast-

master. The association was favored with an address by a prominent cattle breeder who made the timely suggestion that veterinarians, and especially State and Federal officials, should take greater pains to avoid publishing the news when "reactors" are found in herds of pure-bred cattle on account of the great financial losses which may follow unnecessary publicity.

He suggested that such matters be handled by the proper authorities without advertising the breeders' misfortunes.

Officers of the State Association for the year ending July, 1920, are as follows: President, W. H. Martin, El Reno; Vice-President, W. P. Shuler, Oklahoma City; Secretary, D. W. Gerber, Oklahoma City; Treasurer, C. H. Hooker, Vinita.

J. S. GROVE.

WESTERN MICHIGAN VETERINARY MEDICAL ASSOCIATION.

The summer meeting of the Western Michigan Veterinary Medical Association was held June 25th, 1919, at Grand Rapids, Mich., with a clinic in the forenoon at Dr. M. E. Elzinga's hospital. The lunch, afternoon session outing, etc., was held at Manhattan Beach, Reed's Lake.

This meeting was one of the largest and best ever held by the association.

O. H. VAN BRUSSEL, *Sec.-Treas.*

CENTRAL NEW YORK VETERINARY MEDICAL ASSOCIATION.

The tenth annual meeting of the Central New York Veterinary Medical Association was held at Syracuse on June 26, 1919. The business meeting was held at the St. Cloud Hotel, opening at 3:45 P. M., with a good attendance present.

The meeting was called to order by President J. M. Currie and the following members answered the roll call:

Drs. W. G. Hollingsworth	Drs. W. B. Switzer
J. A. Pendergast	J. M. Currie
E. E. Cole	A. J. Tuxill
E. E. Dooling	Frank Morrow
W. L. Clark	A. E. Merry
C. R. Baldwin	W. M. Pendergast

J. C. Stevens	J. V. Townsand
J. K. Bosshart	M. W. Sullivan
A. L. Danforth	D. A. Boardman
W. M. Long	J. H. Stack

HONORARY MEMBERS.

Dr. V. A. Moore	Dr. Otto Faust

The minutes of the previous meeting were read by the Secretary and were approved and ordered placed on file.

The entertainment committee reported that at the last minute they had been unable to find a suitable place to hold a clinic. On motion duly seconded, Drs. J. A. Pendergast and E. E. Dooling were appointed a committee to arrange to secure a suitable place for holding clinics in the future.

It was further moved and seconded that the President appoint a committee to look into the matter of purchasing an operating table for the use of the association, if one could be had at a reasonable price. Drs. Pendergast and Dooling were also appointed on this committee.

An interesting discussion arose in regard to the illegal practitioner; and while it showed that some work had been done, it also showed that there were plenty of violations at the present time.

The President now called for reports of officers, and at this point he was asked to deliver his annual address, which was very interesting and much enjoyed.

The Secretary's report was read and received; and that of the Treasurer was accepted and ordered to be handed to the auditing committee.

The auditing committee reported favorably on the Treasurer's report, and it was ordered placed on file.

The question of members three years in arrears with their dues was taken up, and it was moved and seconded that the Secretary communicate with all such members, and if they then failed to meet their obligations they should be suspended.

The election of officers for the ensuing year resulted as follows: President, Dr. W. L. Clark, Seneca Falls; Vice-President, Dr. A. J. Tuxill, Auburn; Secretary-Treasurer, Dr. W. B. Switzer, Oswego. The acting Censors were reëlected for another year.

A paper on Difficult Parturition, by Dr. W. L. Sullivan, and one by Dr. J. H. Stack, on Lympho-Carcinoma, were presented,

both of which were very interesting and instructive, and provoked a good discussion. Then followed a general discussion on Torsion of the Uterus.

This being the tenth anniversary of the association, a little extra entertainment had been planned by the committee.

The members adjourned to the dining room of the St. Cloud Hotel where an excellent banquet took place, many of the wives and lady friends being present. After the banquet, adjournment was made to the meeting room, where the ladies participated in the pleasure of listening to the instructive addresses delivered by Mr. A. L. Brockway of Syracuse, and Prof. V. A. Moore, Director of the New York State Veterinary College at Cornell University. Dr. Moore's subject was the Physical Examination of Cows, and Mr. Brockway spoke along similar lines, both addresses being very interesting.

The association adjourned until November, and there was a general feeling that no one could afford to miss the meetings of the society.

W. B. Switzer, *Secretary.*

TO OUR VETERINARY ROTARIANS.

ROTARY

(An Acrostic)

Rally, brothers, to *The Wheel,*
Our *Emblem* of desire
To make things better than they were,
And serve as to inspire;
Remembering *Service,* only, aids our brothers
in life's race;
Yet *Self* will ofttimes forge in front, should
Service yield the pace.

W. H. D.

Captain Eddell C. Jones has received his discharge from the Army and has resumed practice at Gothensburg, Nebraska. Captain Jones has been stationed at Camp Greenleaf as post veterinarian for the past six months.

Dr. G. E. Ellis, Baton Rouge, La., has been transferred by the Bureau to Washington, D. C.

COMMUNICATIONS.

Lieut. E. Lapple, V. C., writes interestingly from Montabaur, Germany, although previous to the signing of peace.

Journal A. V. M. A.:

I take great pleasure in writing after my arrival in the 1st from the 90th Division. We are now located in the Rhine River region and don't know when peace terms will be signed, so we may get back again to the good old U. S. A., but let us all hope this may be before the snowflakes fall, as we have all seen enough on this side, and after an absence of a year or more from the dear ones in America, we may be taken back to the "Land of Liberty," where a language is spoken we can all understand. Our speaking in France and Germany is done mostly by the hand method and is hard to understand.

The Journals have been more than interesting to me, as I have no textbooks for reference, and often find time to read all that is contained in them, now that we are out of combatant lines.

The country of Germany is beautiful, and the hillsides all along the Moselle and Rhine rivers are more than beautiful, castles being seen commonly, and they are real good pastime to look into, as quite a few of them contain the bones of individuals who have died many years ago.

The latest information we have is that only 120,000 animals remain in the A. E. F., and we all know they will be disposed of as soon as the Germans sign peace terms.

The Germans are anxious to secure American animals, both for work and eating purposes, as they all use cows in wagons to haul their stable manure to the fields; and some of them use dog teams to make purchases when their back-bags don't accommodate the purchased articles.

As I have no more of interest to say, and feel that it is a pleasure to write in the interest of THE JOURNAL, I beg to close, hoping to see my brother veterinarians at the A. V. M. A. in November.

LIEUT. E. LAPPLE, Vet. Corps.

Dr. J. P. Bushong has severed his connection with the Lederle Antitoxin Laboratories and is now with the Cutter Laboratories at Berkeley, Calif.

NECROLOGICAL.

LIEUT. J. D. LEE.

Lieut. Jeptha D. Lee, a member of the A. V. M. A., died in France about the 1st of March, from an acute attack of pneumonia.

Lieut. Lee was born in Mukwonago, Wis., September 7, 1877. He received his early education there, and later entered Carroll College.

In 1898 he served with Company A, 4th Wis. Vol. Inf., during the Spanish-American War. The year following he entered Marquette University and studied dental surgery. Ill-health at the time forced him to make a change in his choice of professions, and his love for animals made veterinary science his second choice. He graduated from the Ontario Veterinary College with honors in 1907; opened a modern veterinary hospital in Menominee, and enjoyed a large practice, and where his loss is keenly felt throughout the entire community.

Lieut. Lee was one of the first, if not the first, Wisconsin veterinarian to offer his services to his country. He applied for his commission on April 12th, 1917; received it in June, and was called to active service in September. He was assigned to duty with the 111th Train Headquarters and Military Police of the 36th Division, then in training at Camp Bowie, Fort Worth, Texas. He went overseas in June, 1918; served at the front from October 9th until hostilities ceased, with the 111th Sanitary Train, and later was transferred to the 133rd Machine Gun Battalion, 36th Division. Lieut. Lee's loyalty and devotion to duty won him the respect and love of both officers and men.

Lieut. Lee was a member of the historic Lee family.

MISCELLANEOUS.

HUNS DEMAND PEDIGREES OF HORSES STOLEN IN BELGIUM.

Let me commend the following occurrence to the notice of Major August Belmont, of the Jockey Club, in New York, and to that of all the principal clubs and organizations which have at heart the welfare of that king of all sports, horse-racing:

In one of my former letters I described how when the Germans invaded Belgium they looted all the blooded stock upon which they could lay hands. Indeed, only about a quarter of the racing studs in the kingdom escaped seizure by being hurried over the borders into Holland and into France.

But the Germans were unable to secure possession of the pedigrees of the horses thus stolen, and were so infuriated thereby that they deported into Germany the official starter of the Belgian Jockey Club, an Englishman.

In the belief that he either knew the pedigrees or could be instrumental in obtaining them, the man was alternately cajoled and subjected to the most inhuman treatment, all, however, without avail. Today he is a physical wreck.

But what is more amazing still is that although Germany was supposed to have released all entente interned prisoners within a few weeks following the signing of the armistice in the first days of November, the starter is still a prisoner in Germany.

HELD FOR RANSOM.

Worse still is the fact that the Union Club of Berlin, which is the German counterpart of the Jockey Club in England and in France, indeed, for 60 years past the premier social and sporting club of all Germany, has addressed a communication to the Belgian Jockey Club admitting the fact that the starter is still detained in Teuton captivity and quite shamelessly demanding as a condition of his liberation that the pedigrees of the blooded stock stolen from Belgian stud farms and racing stables should be surrendered to the club.

Moreover, one of the principal officers of the Union Club, one of the numerous Princes Hohenlohe, has sent an independent letter to the secretary of the Belgian Jockey Club offering his per-

sonal influence in securing the liberation of the starter and his return to Belgium if the secretary would be so good as to obtain for him — that is to say, for the writer — the pedigree of a particularly beautiful mare which he had carried off from Belgium.

WARNED OFF THE TURF.

These are not matters of mere gossip, but of actual record. They have been communicated by the Jockey Club of Belgium to the jockey clubs in Paris and in London, and have resulted in a unanimously adopted resolution barring the entry of all horses owned by the Huns and by their Austrian and Hungarian allies, and warning German owners, German trainers and German jockeys off the British and French turf.

The ban will apply equally to any English or French trainers or jockeys who may remain in Teuton employ or who may take service in Germany or Austria. It is up to the various racing organizations in the United States to follow suit. Racing is based on the observance of certain ethics of honor. Without these ethics clean sport is impossible, and in the late war the Germans have shown in a thousand different ways that they do not consider any laws of honor as binding.—*Washington Post, June 18, 1919.*

OKLAHOMA NOTES.

Dr. Leroy B. Fox has returned from several months' sojourn among the Indians in the vicinity of Kearn's Canyon, Arizona. He reports that the natives are not entirely in sympathy with the efforts of the B. A. I. to eradicate dourine from their horse stock, although about 4 per cent of the animals handled were found to be infected.

Dr. H. H. Kettler, formerly with the B. A. I. at Fort Worth, Texas, and more recently with the Army Veterinary Corps, has been reinstated on the meat inspection force at Oklahoma City.

Dr. L. D. Barber, State agent for the Purity Serum Co., has opened an office at the Oklahoma National Stock Yards.

Dr. C. H. Reid entered the service of the State as a Deputy State Veterinarian July 1st. He will devote most of his time to tuberculosis eradication.

Dr. Roy C. Smith has resigned his position as dairy inspector in Enid and accepted an appointment as Deputy State Veterinarian on July 1, 1919.

Dr. Fred S. Molt, Veterinary Inspector, is recovering from a very severe attack of malaria.

Dr. H. W. Ayres, who has been with the Army Veterinary Corps at Camp Upton, N. Y., for nearly a year, has finally secured his discharge and returned to Oklahoma City June 27th.

J. S. GROVE, *Resident State Secretary.*

EXHIBITION OF THE MEDICAL DEPARTMENT, U. S. ARMY, AT CONVENTION OF AMERICAN MEDICAL ASSOCIATION, ATLANTIC CITY, N. J.

JUNE 9 TO 14, 1919.

VETERINARY DIVISION

This comprised a series of types of chests of articles used in this service and charts, maps and photographs showing its work in the care of horses and mules. Charts were presented showing the non-effective and death rates among horses and mules for the American expeditionary forces and in the United States, and also the death rate from glanders. Phases of the inspection and transportation of meat and meat food products were also shown in photographs. Types of chests shown were: Those issued to veterinary hospitals containing surgical instruments, to hospitals of capacity of 1,000 animals, with contents, those containing miscellaneous veterinary supplies as issued to hospitals; those containing dental instruments, veterinary field unit chest issued to mobile troops and camp organizations, and field chest issued to each veterinary officer in the field. There was also shown the officer's wallet issued to veterinarians on field duty, and the wallet issued to each farrier.

TICK ERADICATION IN THE SOUTH.

Status of cattle dipping for the month of June, 1919, in the following States:

	Number of dippings.		Number of dippings.
Alabama	994,275	North Carolina	7,589
Arkansas	655,479	Oklahoma	627,572
Florida	275,687	South Carolina	143,641
Georgia	528,409	Texas (North)	1,612,969
Louisiana	1,505,614	Texas (South)	322,359
Mississippi	423,686		

JOURNAL

OF THE

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FORMERLY AMERICAN VETERINARY REVIEW

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W. H. DALRYMPLE, Editor. BATON ROUGE, LA.

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KEEP THE STANDARDS UP.

While we are not aware at this time that the question of educational standards is to form a topic for discussion at the coming annual meeting of the Association, it would be well to bear in mind that the progress being made in the field of veterinary science, in its different branches, as well as in animal husbandry, demands higher educational standards than those obtaining in the past; and the future will no doubt require even higher, if the profession is to obtain and maintain the position it ought to occupy, and the usefulness which will be demanded of it.

The education and accomplishments which were thought good enough, and seemed to serve their purpose, in days gone by, fall short of present-day necessities, and for future demands are likely to be more or less obsolete and inadequate.

The writer was much impressed by some statements, along this line, in an article by Dean Eugene Davenport, of the University of Illinois, in a recent number of the *Breeder's Gazette*, when referring to a proposed veterinary college in connection with the University.

Among other things, Dean Davenport says:

"Nothing is clearer than that a new era is at hand in respect to education and research within the field of veterinary science. Recent discoveries have thrown new light on the causes of diseases in animals and man, and while they have made treatment more rational than heretofore, they have vastly complicated the subject as a whole. Because of this, the old-time methods and materials of instruction have rapidly become antiquated, and any college which now undertakes to prepare practitioners in this field must be equipped with the best of apparatus and the most skilled of instructors if it is to meet the demands which the public rightfully makes.

"Contemporaneous with this increased knowledge of animal diseases has come a sweeping change in the field of effort; that is to say, modern veterinary science aims at the control of animal diseases and their prevention, rather than at the cure of a few individuals which have become afflicted. This again is a more complicated matter, in that the field of study is much broadened, and involves many more considerations than heretofore.

"This change in subject matter and in objective has resulted in a closing up of many of the earlier schools in veterinary medicine, and for no other reason than that the research and instruction which new conditions seemed to require laid a burden and expense upon the organizations which they could not meet. This is only another way of saying that instruction in this field is now absolutely tied to investigation, and that the two together are vastly more expensive than in the older days when the only object was to diagnose the illness of individual animals and prescribe a standard cure."

In a recent address before the American Society for Clinical Investigation, Dr. Graham Lusk, of New York, in referring to the conditions of some of the medical schools in the earlier days, makes the statement,

"These were the days when there appeared to be no future for clinical science, days in which there was almost no intellectual, social, or financial influence making for its welfare. And yet we in this country, since that time, have made great headway in this direction, not on account of the influence of any special men, but because the principle that the primary mission of a medical school 'to take some part in the advance of true medical knowledge, and not merely to diffuse what is already known,' is everlastingly right."

And he further states:

"In this great land of ours, which is overflowing with opportunity and abundance, it is of very special importance to elevate our intellectual standards. Many scientific men hardly seem to realize the heavy world responsibilities which have been placed upon us."

We have quoted somewhat freely from these two men of broad vision in order to emphasize our point in connection with the elevation of our educational standards. If it is considered necessary by the medical profession to elevate intellectual standards in the interest of humanity, *per se,* it seems just as essential that the standards of medical science as applied to the lower creatures should be kept up, not alone for economic reasons, but because the veterinary profession plays a very important part in the conservation of the public health through the control and eradication of those diseases which are transmissible from animals to man. So that besides, or in addition to, the personal or more selfish ends to be subserved, it should be remembered that the profession is the servant of the public, through whom it maintains its existence, and in order to meet the public's ever-increasing demand for better and more effective service, it will be necessary that our educational standards keep pace with the more modern requirements, and the "greater responsibilities placed upon us." Therefore, we say, "Keep the standards up."

THE JOURNAL: PERSONAL OWNERSHIP.

So far the Editor has had no special reason to complain of lack of contributed material for the upkeep of The Journal, but he is sometimes led to feel that there must be a great deal of valuable copy that ought to be received for publication, but which, evidently, fails to reach the editorial sanctum.

With the numerous and valuable papers presented at the various state association meetings throughout the year by members, who are also members of the A. V. M. A., and of which The Journal is the official organ, one would think that there never ought to be a scarcity of this particular class of material for publication. Also, with so many veterinary institutions throughout the country, the personnel of each being mainly composed of members of the Association, a plenitude of clinical reports should be forthcoming each month to supply readers with matters of interest and instruction in that particular department. And, further, there is the vast number of members in private practice who, amongst them, could furnish most valuable data for fellow practitioners, etc. Consequently, with such a large membership in the A. V. M. A., engaged in different branches of the profession, to draw upon, one is led to think that The Journal

should never suffer from, even the possibility of, a shortage of material for its pages. And while, to repeat, such a condition of affairs has not actually occurred thus far, the copy in hand to fill up the various departments, more particularly after the proceedings of the previous annual meeting have been used up, occasionally gets to a point which gives the editor more or less concern with reference to subsequent issues.

We have given this matter a good deal of thought and have tried to reason out, with so much material to draw upon, why more copy is not submitted by members of the Association for publication in their official organ, and we have reached the conclusion that one, if not the main, reason is, that members fail to realize that The Journal is not an independent privately-owned publication, but is the property of the American Veterinary Medical Association, each individual member having a personal ownership in it, and, therefore, ought by right to feel a certain responsibility in aiding the editor in trying to make it the success we all would wish to see it as the official organ, and worthy, of the largest veterinary organization extant.

We cannot but believe, however, that if each member would get this personal-ownership-idea, he would view the upkeep of his Journal from an entirely different standpoint, and would realize that a certain amount of responsibility rests with him, so far as its ultimate success is concerned.

Members of the Association, The Journal is ours, individually and collectively. Therefore, let each and all of us contribute to its usefulness, in its various departments, as a scientific and practical aid to the veterinary profession in general.

We feel that it should be unnecessary for us to have to make an appeal of this kind; and we do not believe it would be, if every member would assume the correct attitude toward The Journal, which, in reality, is his own property. However, as we are about to commence a new Volume, we felt we might be pardoned for drawing attention to the matter at this particular time.

Editor's Note: Owing to conditions brought about by the late war, and the changes of location of many members of the Association and subscribers to The Journal who were in the Army Veterinary Service, it was to have been expected that irregularities would occur with regard to the delivery of the pub-

lication. However, now that matters have assumed a more normal condition, with more permanent addresses being established, it is to be hoped the irregularities spoken of will be largely eliminated.

In order to effect more immediate delivery of THE JOURNAL in the case of those who have not been receiving it regularly, the Editor has three suggestions to make, viz:

1st. That all communications concerning changes of addresses, or non-delivery of THE JOURNAL, should be sent direct to the office of the publication, Baton Rouge, La., and not to the Secretary of the Association in Chicago.

2nd. In order that requests may be met, and the following month's issue of THE JOURNAL sent to the newer address, all such communications should be received at the office in Baton Rouge, La., not later than the 15th of the month.

3rd. When giving a new address, the old one should always be mentioned.

ROBERT LOUIS STEVENSON ON HEREDITY.

"Our conscious years are but a moment in the history of the elements that build us. . . . And though today I am only a man of letters, either tradition errs or I was present when there landed at St. Andrews a French barber-surgeon to tend the health and the beard of the great Cardinal Beaton; I have shaken a spear in the Debatable Land and shouted the slogan of the Elliots; I was present when a skipper, plying from Dundee, smuggled Jacobites to France after the '15. . . . . Yes, parts of me have seen life, and met adventures, and sometimes met them well. And, away in the still cloudier past, the threads that make me up can be traced by fancy into the bosoms of thousands and millions of ascendants: Picts who rallied round Macbeth and the old (and highly preferable) system of descent by females, fliers from before the legions of Agricola, marchers in the Pannonian morasses, star-gazers on Chaldean plateaus."

Dr. Geo. H. Berns of Brooklyn was elected President in June of the Alumni Association of the New York State Veterinary College at New York University.

A PRELIMINARY NOTE ON A NEW COCCIDIUM OF RABBITS.

E. A. Bruce, Agassiz, B. C.

· Without entering into the controversy as to whether the common coccidia of the rabbit's liver and intestine are one and the same species or not (*E. stiedæ; E. perforans*), it may be said that another coccidium has been found in British Columbia.

PATHOGENESIS.

Affects the intestinal tract. Is especially pathogenic for very young rabbits, often causing the loss of a whole litter. Mature animals are affected but appear to suffer no ill effects, and may carry coccidia for several months. Fatal cases may or may not be preceded by diarrhœa. Once diarrhœa is established death usually follows in 24 hours. Three cases have been seen in which infection was mixed, *E. stiedæ* being present as well as the coccidium under consideration.

THE PARASITE.

The life cycle may be completed in as short a time as five days. Oocysts kept in 3½% pot. bichromate were infective six months after being passed.

The endogenous forms have not as yet been fully worked over, the following remarks therefore apply to parasites found in the fæces. The oocysts, generally oval, vary greatly in size from 11.62 μ to 24.90 μ in width, and from 15.77 μ to 39.84 μ in length. The oocyst wall is thick, and in the larger specimens is of a well marked pinkish-orange colour. Many show an excess of material comprising the outer wall; this may show at any part, even extending down the whole length of the cyst and projecting outwards for several microns, but is commonest towards the narrow end, where a large micropyle is present.

The oocyst contains in addition to the four dizoic spores characteristic of the genus *Eimeria,* a very well marked globular residual body composed of a large number of granules. This residual body is seen as soon as sporoblast formation begins, and is as large or larger than the individual sporoblasts; it is absolutely spherical and retains its shape until the sporozoites are

formed when it sometimes disintegrates, the granules being scattered around the sporocysts.

The sporocysts contain a well-marked residuum.

The nucleus of the sporozite is a delicate pink.

SUMMARY.

This coccidium of the genus *Eimeria* which is especially pathogenic for young rabbits, differs from previously described forms: In the extreme variation of the size of its oocysts, the pinkish-orange colour of its larger oocysts, the excessive formation of material for the oocyst wall, the pink colour of its sporozite nucleus, and the presence of a very well marked globular residual body.

A series of drawings covering the exogenous forms is now ready, but publication of the same is being deferred pending a completion of a study of the whole life cycle.

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ON THE LIFE HISTORY OF THE LUNGWORM.

Dictyocaulus filaria, in Sheep.
[Preliminary Report.]

JOHN E. GUBERLET.
Contribution from Parasitological Laboratory of the Oklahoma Agricultural Experiment Station, Stillwater, Oklahoma.

Some investigations on the lungworms in sheep are being carried on in this laboratory in which the principal facts in the life history of *Dictyocaulus filaria* (Rudolphi) have been determined. The investigations are as yet incomplete and further work is in progress. It seems, however, that a report of the results thus far obtained would be desirable. It is expected that a more complete report will be made at a later date.

Herms and Freeborn (1916 and 1917) reported upon the symptoms and methods of treatment for lungworms in sheep, goats and other domesticated animals. They also considered some factors in regard to the development of these parasites. Von Linden (1915) (after Herms and Freeborn) in reporting upon the free-living stages of larval lungworms stated that there are two types of embryos. One type is adapted to a free-living stage outside the body of the host and is later supposed to be

capable of infesting a new host. The other type is unable to do so but is supposed to grow to maturity within the body of the original host. This belief was partly confirmed by Herms and Freeborn (1916) but was later rejected by them (1917). Neither of the above writers was able to bring about an experimental infection.

During the course of the investigations carried on here some facts were observed in connection with the development of the larval worms and the method by which they leave the body of the host, also the method by which they gain entrance to a new host.

The writer wishes to express his appreciation to Dr. L. L. Lewis of the Veterinary Department, Oklahoma Agricultural College, Stillwater, for advice, many valuable suggestions and criticisms which he has so kindly offered during the course of this work.

METHODS BY WHICH EGGS AND EMBRYOS LEAVE THE BODY.

The eggs of *Dictyocaulus filaria* are extruded into the air passages of the lungs and are carried up through the trachea to the pharnyx with the muco-purulent discharge which accompanies them. They are then swallowed and pass from the body through the alimentary canal. Some eggs leave the body in the muco-purulent discharge through the nostrils, but these are probably very limited in number. The writer has made more than two hundred miscroscopic examinations of smears from the nasal discharges of sheep which were heavily infested with lungworms and a total of only six or seven eggs were found. From the same sheep numerous larvæ were observed in the feces upon microscopic examinations of the mucus in the trachea and bronchi and of the feces. In making examinations of the mucus of the trachea and pharnyx only one free larva was observed while numerous eggs were present. Several eggs were observed in the esophagus. Herms and Freeborn (1917: 866) state that eggs can be demonstrated in the contents of the small intestine throughout its entire length but that they are absent in the large intestine and feces. That seems to indicate that the eggs may hatch in the large intestine since the embryos can be demonstrated very readily in the feces.

The eggs that leave the host by way of the nostrils or mouth may hatch and develop into larvæ capable of bringing about infestation in another host if deposited in favorable conditions.

DEVELOPMENT OF EMBRYOS.

The development of the embryos of *Dictyocaulus filaria* is similar in most respects to that of the stomach worm (*Hæmonchus contortus)* as shown by Ransom (1906). The females of *D. filaria* are oviviparous and therefore deposit eggs containing active and well developed larvæ. The eggs extruded by the worms, or taken from their uteri, hatch in 24 to 36 hours at a temperature of 16° to 20° C., when placed in tap water, pond water, normal saline solution or moist soil. Only a very few of the eggs hatch when placed in dust. Those that do hatch die within a short time. Larvæ taken from feces also die in a few hours when placed in dust. The newly-hatched embryos are of the oxyuriform type with a tubercle having three chitinous lips or teeth at the anterior end. The larvæ are from 350 μ to 375 μ in length and appear to be of only one type, contrary to the report of Von Linden, who states that there are two types.

The embryos placed in water, moist soil or droppings make a rapid growth, reaching a maximum length of from 490 μ to 600 μ, during which they molt at least twice. The first molt takes place in from two and one-half to five days. Most of the larvæ cast their skins in four or five days. Some, however, retain this skin or sheath. The second molt takes place in seven to ten days. Apparently a few of the worms cast the skin of this molt also. Some of the embryos retain the skins of both molts while most of them retain only that of the second which serves as a protective sheath. Those which cast the skin of the second molt develop a third sheath which acts as a protection. In this protective sheath the larval worms can withstand drought and cold. The sheath is apparently sealed at both ends to prevent excessive loss of moisture by evaporation.

As soon as the embryos reach the second molt they migrate onto upright objects. In the experiments in the laboratory they migrated onto small clods, blades of grass and up the sides of the glass dishes and onto the under side of the lids of the containers in which they were kept. The migrations took place when the air in the dish or bell jar was saturated with moisture. As soon as the air became less humid the larval worms coiled up wherever they happened to be. When conditions became moist again they continued their migrations upward on the blades of grass or on the glass. When the embryos became dry they shrank within the sheath leaving some space between their body and the protective sheath.

RESISTANCE OF EMBRYOS.

The embryos of lungworms before developing to the sheathed stage show but little resistance to dryness. After developing the protective sheath they show remarkable resistance to adverse conditions. Some sheathed embryos in normal saline solution, others in pond water, and still others in moist soil, were frozen solid for a period of ten or twelve days and when thawed out they were active and seemed to suffer no injury. They were later repeatedly frozen and thawed for several days without material injury. Some embryos which were reared in moist soil until they had developed their protective sheaths were then allowed to dry. These larval worms have been in a thoroughly dried state for a period of nearly five months and some are still alive. Upon examination they appear lifeless and completely dried and are shrunken within the sheath, but when placed in moisture they show signs of life in about fifteen or twenty minutes. In the course of one-half to three-quarters of an hour they are active.

A number of sheathed embryos were preserved for study. They were killed by dropping them into boiling 70% alcohol and 10% glycerine and some were observed to be still active at the end of nearly three hours.

Some larval worms have been kept alive in normal saline solution and in pond water for a period of over three months. Others in moist soil and upon blades of grass have been kept alive in the laboratory between five and six months, the period of time over which the experiments have been conducted.

EXPERIMENTAL INFESTATION OF LAMBS.

Two lambs were used for experimental purposes and were inoculated with the sheathed embryos of *Dictyocaulus filaria.* Both lambs were free from lungworms as shown by repeated microscopic examinations of their feces. These were kept in thoroughly disinfected pens and care was taken that their food was not contaminated in any way.

The first lamb was given between six and seven hundred embryos on January 25th. These were given in gelatine capsules through the mouth directly into the stomach, followed by a small amount of water from a bottle. Fecal examinations were made every four days. The lamb showed some symptoms of infestation on February 18 and 20 when it sneezed a great deal and had several very severe fits of coughing, the cough being of that husky nature which is typical in sheep infested with lungworms.

The sneezing and coughing continued at intervals with mucopurulent nasal discharges until the animal was killed. On March 4 larval lungworms were first observed in the feces. The embryos were then observed in the feces almost daily until the lamb was slaughtered on March 21.

The post-mortem examination showed the lungs very badly congested, especially at the extremities of the lobes. One hundred and seventy-five worms were taken from the air spaces and congested areas of the lungs. The majority of the immature worms appeared in the air passages immediately adjoining the congested regions. Many also were found within the solid areas. Undoubtedly, a considerable number of worms were left in the lungs unobserved, as they were in the minute air spaces in the congested areas and could not be detected. Many of the worms were mature while the others were more or less immature.

The second lamb was given five or six hundred sheathed embryos on April 18 and 19. These were given in capsules directly into the stomach as in the first lamb. Fecal examinations were made every four days. The lamb first showed symptoms of infestation on May 10th, when it did some sneezing and had a very severe fit of coughing. The sneezing, coughing and nasal discharges were then observed almost daily until the lamb was killed. Larval worms were first observed in the feces on June 1, when they appeared in large numbers. Numerous embryos were then observed daily until the lamb was slaughtered on June 11.

On post-mortem examination it was found that the extremities of the lobes of the lungs were badly congested. The anterior lobe of the right lung had partly atrophied and was not functional, which undoubtedly was the result of the severe congestion. Nearly two hundred worms were taken from the air passages and congested areas of the lungs. Some of the worms were mature while the others were nearly so.

Post-mortem examinations were made on several lambs taken from the same flock during and immediately following the period of these experiments and in no case was there any indication of lungworm infestation.

The results of these experimental infections showed that the worms reach maturity, or the egg-producing stage, in from five to six or seven weeks after being ingested by the sheep. The method by which they pass from the alimentary canal to the lungs is still a matter of conjecture. They undoubtedly burrow

through the lining of the stomach or intestines and enter the lungs either through the blood stream or through the lymphatics. Experiments are under way in an attempt to clear up this point.

METHOD OF GAINING ENTRANCE TO THE HOST.

The larval lungworms are passed from the infested sheep with the feces. If deposited under favorable conditions of temperature and moisture they will molt and develop to the ensheathed infectious stage in about eight or ten days. In low swampy lands where there is sufficient moisture and humidity so that the air is saturated and the vegetation becomes wet, the ensheathed embryos migrate onto the blades of grass and other vegetation where they are eaten by grazing sheep or other suitable host animals. The larval worms then migrate to the lungs where they complete their development.

Ponds and stagnant pools are probably not of great importance as a direct source of infection because the embryos sink to the bottom and remain there unless carried to the surface by currents, or by stirring the water. However, in real shallow pools some worms may gain entrance to sheep from this source. Ponds undoubtedly play a more important part in an indirect way in that they provide moisture and a more or less humid and saturated atmosphere which is a favorable environment for the development of larval lungworms.

SUMMARY OF LIFE HISTORY.

The life history of *Dictyocaulus filaria* may be summarized in the following manner:

1. The eggs are extruded into the air passages of the lungs and pass to the pharnyx with the mucus and are swallowed. The eggs hatch while passing through the alimentary tract and the resulting embryos leave the animal in the feces where they can be readily demonstrated.

2. The embryos, when deposited in favorable conditions of temperature and moisture, molt and develop protective sheaths in eight to ten days.

3. The ensheathed embryos leave the feces or soil when the atmosphere becomes saturated with moisture and migrate onto blades of grass or other vegetation where they may be eaten by grazing animals. When eaten by suitable host animals they migrate to the lungs, where they complete their development.

4. When the larval worms reach the lungs they cause very severe hemorrhages and congestion in certain areas, resulting in pneumonia.

5. The ensheathed embryos possess remarkable resistance to cold and dryness. They may be frozen for considerable periods of time or repeatedly frozen without injury. They may also be completely dried for considerable periods of time without injury.

6. The larvæ of *Dictyocaulus filaria* reach maturity in the lungs in five to six or seven weeks after being taken into the stomach of a suitable host animal such as a sheep, or other ruminant.

7. The mode of gaining entrance to the body of the host is peculiarly adapted to grazing animals, since the larvæ migrate onto blades of grass and other vegetation where they can be readily eaten.

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RELATIONSHIP OF EQUINE AND HUMAN GLANDERS.

By C. D. McGILVRAY, Toronto, Ont.

It has long been recognized that glanders was a specific disease affecting equines and that its occurrence had a special significance owing to its transmissibility to man.

The causal organism is the "Bacillus mallei," which was isolated and grown in pure culture by Lœffler and Schutz in 1882. Prior to this the disease was nevertheless generally acknowledged to be of a contagious character and the identification of the "Bacillus mallei," supported by exact animal experiments, was confirmative. Glanders has been found more or less prevalent among horses in all countries irrespective of climate, with the possible exception of Australia, which appears to have remained exempt.

In Canada the disease has been largely suppressed although formerly it prevailed quite extensively in certain sections, entailing considerable losses among horses and occasionally affecting man. The disease has some points of interest in its clinical aspects in man and horses.

GLANDERS IN MAN.

In alluding to the occurrence of Glanders in man I am prompted to do so in view of the fact that two cases came under personal observation while dealing with the eradication of glanders among horses in Manitoba. The details of these cases are appended herewith and are recorded in monographs on Human Glanders published during 1906 and 1907 by G. D. Robins, M. D., of the Royal Victoria Hospital at Montreal.

CASE OF DRS. GRAIN AND ROSS.

The subject was a young farmer named Fraser aged 22 years, residing near Selkirk, Manitoba. He had been away from home for a few weeks and returned on August 20th, 1905. During his absence one of the horses on the farm had acquired a profuse nasal discharge. He closely examined the horse, particularly its nostrils and its mouth as to the condition of its teeth. During the process of examination of the teeth one of his hands was slightly scratched. Two days later (August 22nd) he felt languid while at work and during the day vomited several times. The following day, August 23rd, he refused food and complained of pains in the region of the loins and hips. During the succeeding days he continued to get worse and on August 26th a physician was consulted and made a diagnosis of probable typhoid fever, there being at this time no external manifestations suggesting glanders.

On September 3rd the first clinical objective symptom appeared as a large painful nodule on the forehead. Two days

later the nodules had rapidly increased and appeared almost simultaneously on the chest, arms and legs. The joints became extremely painful owing to involvement of the articulations and synovial membranes. On September 6th the nodules had developed into pustules and later formed ulcers. The nostrils ulcerated and discharged a viscid bloody material. On this date an examination of the horses was made by me and I also had the privilege of seeing the young man. One of the horses showed well-marked clinical evidences of glanders and was confirmed by mallein test. The attending physicians also made a positive diagnosis of glanders in the man, which was confirmed by cultures and male guinea pig inoculation. Pustules and ulcers developed still more rapidly, the lips and eyelids ulcerated, accompanied by a viscid discharge causing one eye to become completely closed. The patient succumbed on September 8th, literally covered with pustules and ulcers.

Notanda: The period of incubation was two days, as the patient unquestionably became inoculated on August 20th and on August 22nd became ill. The typhoid-like illness continued for 12 days, and on September 3rd the first clinical objective symptom appeared followed by the period of nodular eruption, nasal discharge and ulceration lasting five days, death taking place on September 8th. The duration from time of infection to death was 18 days.

CASE OF DR. J. D. STEWART.

The subject was a farmer named Hall aged 35 years residing near Darlingford, Manitoba. Several of his horses had acquired profuse nasal discharge and sores on the skin of the limbs. The owner undertook treatment of the horses and during the process became infected during the first week in May 1905. On May 5th he began to feel unwell and complained of headache. He continued at work until May 8th when on account of severe painful swelling in the right leg and left arm he remained in bed. A physician was consulted and it was thought the ailment was probably inflammatory rheumatism. On May 12th I happened to see his horses and found them suffering from advanced glanders. I also examined the man, he complained of pains in the axilla, and in his joints, particularly the knees and hips. His face showed marked icterus with darkish areas under the eyelids. On the calf of the right leg and on the left upper arm

there was present a painful swollen tense shiny area of cellulitis about the size of one's hand. I reported the case to Dr. J. D. Stewart at Darlingford, Manitoba, and advised him that in my opinion it was glanders developing.

He visited the patient and found him restless and feverish, temperature being 103.2°— and pulse 100. The circulatory and respiratory systems were negative. The patient's conditon remained unchanged until May 16th, when the fever increased and an ulcer had formed on the left shoulder and a nodule on the forehead and one on the left thigh. The pulse was quite irregular; there was no cough, and no nasal discharge as yet. On May 17th the patient was in extreme agony through pain and greatly depressed.

Reddened nodules and pustules developed on the shoulders, back and thighs. At this time a consultation of three physicians took place by request of Dr. Stewart. On May 19th the patient became literally covered with sores and died the following day, May 20th, 1906.

The diagnosis of glanders in the horses was confirmed by mallein test.

The diagnosis in the case of the man was confirmed by cultures and male guinea pig inoculation.

Notanda: The period of incubation, while not definitely fixed, did not exceed five days, as patient began treatment of his horses on May 1st and became sick on May 5th. The disease extended from May 1st to 20th, the duration thus being about twenty days.

GLANDERS IN HORSES.

Natural infection occurs through the medium of the nasal discharge and secretions of the cutaneous ulcers from diseased animals. In the majority of cases infection in horses takes place through the ingestion of food or water contaminated with the "Bacillus mallei" contained in the nasal discharge from infected animals. While the disease spreads less rapidly when horses are kept under good sanitary stable conditions or where they are kept at pasture, nevertheless it must be acknowledged that even under these apparently favourable conditions it frequently prevails to a considerable extent. This is clearly demonstrated by the occurrence and spread of glanders among horses on the open ranges of the west. In general the disease is disseminated through the ordinary channels of horse traffic and frequently

through the medium of occult cases. In horses glanders varies in duration but usually inclines to a chronic course characterized by the development of nodules which tend to degenerate and to form lesions affecting the mucous membranes, the skin, lymphatic glands and internal organs, more especially the lungs and liver. In the majority of cases the lungs and air passages are affected. Sometimes the lesions are limited to the lungs in the form of grayish tubercle-like nodules and at other times by pneumonic areas with purulent or caseous foci embedded therein. These are the so-called occult cases or concealed pulmonary glanders, which largely predominate in horses. Where the air passages are affected the lesions are found chiefly affecting portions of the trachea, the larnyx and the nasal cavities, accompanied with nasal discharge.

In the early stages of development the lesions appear on the affected mucous surface as grayish nodules the size of millet seeds surrounded by a reddened area. Degeneration of the nodules results in the formation of ulcers which, as a result of coalescence and tissue destruction, are of varying size and somewhat irregular in shape with raised borders and ragged edges. Where the skin is involved the lesions appear as small nodes and bud-like ulcers, the so-called "farcy-buds." The legs are most generally the seat of the cutaneous lesions, although they also occur at times on the face and sides of the body. At the onset there is frequently an acute edema or lymphangitis extending up the forearm or the thigh. This is succeeded by the development of nodes and the formation of farcy buds along the course of the lymphatic vessels. The appearance of one bud is rapidly followed by others extending in rows along the corded lymphatic vessels.

The buds at first exude a viscid oily material which adheres like varnish to the surrounding hair. Later they become transformed into deep crateriform ulcers with thickened granulating margins and a purulent secretion which at times is reddish.

The submaxillary lymph glands invariably become enlarged on the side corresponding to the affected nasal cavity, particularly when there is nasal discharge. At first the affected gland is slightly tumefied and sensitive, but subsequently, as a result of persisting adenitis, it becomes organized into a firm, knotty tumor firmly embedded in the surrounding tissues. Where the lungs are affected the bronchial lymph glands may also show infection.

DIAGNOSIS.

In horses the cardinal signs constituting clinical cases of glanders may be enumerated as follows:

1. A chronic discharge either from one or both nostrils, which is tenacious, becoming profuse, and occasionally tinged with blood and generally without offensive odor.

2. Visible ulceration of the nasal septum.

3. Enlargement and induration of the sub-maxillary glands on the side corresponding to the affected nasal cavity.

4. The presence of farcy nodes, buds or ulcers on the skin of the legs or body.

In referring to the dignosis of glanders in horses it should be clearly understood that they may be affected for a considerable length of time, even for a year or more in some cases, without showing any recognizable clinical evidences. These are the so-called occult cases or pulmonary glanders, in which the disease remains in a concealed state affecting the lungs or the air passages. These occult cases predominate in horses and form the larger percentage of those affected. In view of this some satisfactory means must therefore be employed to detect occult cases and to confirm the diagnosis in clinical cases. For this purpose allergic reactions are adopted and the test is made with Mallein, which is prepared from the toxic substance produced in cultures of the "Bacillus mallei." When applied to suspected animals the resulting negative phase or positive reaction serves as an index as to the presence or absence of infection. The nature of the reaction to Mallein depends on the method of applying the test, there being three methods available, either of which may be employed. They are known respectively as the Ophthalmic Mallein Test, the Intra-palpebral Mallein Test, and the Subcutaneous Mallein Test. In the application of the Ophthalmic Mallein Test four or five drops of concentrated Mallein are placed within the lower eyelid with a dropper or a camel's hair brush. Nothing is put in the other eye, which thus serves as a control. The positive reaction becomes noticeable within ten hours and lasts from six to thirty hours longer, and is manifested by a muco-purulent secretion from the inner canthus of the eye and reddening of the conjunctiva with edema of the eyelids. In the negative phase the eye remains unchanged. In the application of the Intra-palpebral Mallein Test a few drops of Mallein are injected hypodermically into the skin of the lower

eyelid. The positive reaction is manifested by painful swelling of the eyelid and a muco-purulent secretion from the inner canthus. The swelling increases during the twenty-four hours following the injection and continues for forty-eight hours or longer. In the negative phase a slight edema may be present which is comparatively painless and usually disappears during the first twenty-four hours.

In the application of the Subcutaneous Mallein Test about 2½ c. c. of Mallein solution is injected subcutaneously with a hypodermic syringe, the site selected being the side of the neck. Before injection the temperature is taken twice three hours apart to obtain the normal range.

Following the injection the temperature is taken, commencing with the tenth hour and recorded at intervals thereafter two hours apart until the twentieth hour. The positive reaction is manifested by a marked increase of temperature reaching and exceeding 103° F., and the development of a hot painful swelling at the seat of injection on the neck. The typical reactionary swelling is circular in outline three inches or more in diameter and persists for twenty-four hours or longer.

In the negative phase the temperature remains within a normal range and at the site of injection there is only a slight local edema which tends to disappear in a few hours.

THE SUPPRESSION OF GLANDERS.

Glanders in man may be regarded to some extent as an occupation disease in that those affected have usually intimate relationship with horses and contract the infection by inoculation direct from a diseased horse, or else are laboratory workers who become infected with the "Bacillus mallei" while engaged in laboratory diagnostic technique. The prevalence of human glanders depends on the existence of equine glanders. Thus cases of human glanders become more prevalent where the disease prevails extensively among horses.

The eradication of equine glanders is therefore essentially important. In the suppression of equine glanders in Canada all animals which definitely react to Mallein are immediately slaughtered and their carcasses properly disposed of by burying or by cremation. The stables and utensils contaminated by the diseased animals are then thoroughly cleaned and disinfected under the direct supervision of a Veterinary Inspector of the Health of Animals Branch. The remaining horses are again tested in fif-

teen days, and if no further reactions are detected the premises are released from quarantine.

As a result of this policy the disease has been materially reduced and its complete eradication is possible and has already been accomplished in several of the Provinces of Canada.

The subjoined statistical information shows the progress made and the compensating cost of suppressing glanders during a period of 13 years, extending from 1905 to 1917:

YEAR.	Horses tested for Glanders.	Reactors affected with Glanders.	Amount of Compensation paid.
1905	1,777	871	$69,053.27
1906	1,403	336	27,207.37
1907	3,065	199	17,303.11
1908	1,319	124	9,304.91
1909	813	70	5,391.27
1910	380	19	1,536.66
1911	930	38	3,389.98
1912	993	24	2,030.00
1913	247	20	1,780.00
1914	733	45	5,313.33
1915	177	4	443.33
1916	37	Nil	Nil
1917	40	Nil	Nil

THE URGENT NEED FOR MEAT INSPECTION LAWS IN OUR CITIES AND TOWNS, AND IN RURAL IOWA.*

J. H. McLeod, Charles City, Iowa.

[Editor's Note: During the session of the Iowa State Legislature recently adjourned, legislation was enacted covering a number of the points suggested in Dr. McLeod's paper, particularly in connection with the control of tuberculosis and the safeguarding of the public milk supply.]

In presenting this subject under the above title, I realize that the situation in Iowa is only partially covered, as the necessity for action in recommending adequate state laws, which will not only insure a pure meat supply, but legislation governing our milk supply is, of course, equally important and necessary.

We, as veterinarians and sanitarians, are not necessarily concerned with the historic past in this connection, except to correct apparently defective and obsolete statutes, which now have only a limited place in the control of infectious or contagious disease. It was once believed (and not so long ago) that fumigation was

*Presented at the 31st Annual Meeting of the Iowa Veterinary Association, Ames, Iowa, January, 1919.

one of our main reliances in preventing the spread of contagious disease. Now a fuller understanding of the manner in which infection is spread and careful tabulations of statistics show the emphasis belongs on much more important preventive measures.

Koch's theory, that the bovine type of tubercle bacillus did not infect man, is past history, but even so that belief and opinion from Koch has proven to be of great value, as it started scientific investigation in that direction, which has since demonstrated conclusively that the bovine type of tubercle bacillus can and does infect man, and is one of the main factors in primary infection of this disease in children. So we have gathered from this opinion and belief of Koch's, some facts concerning this disease that must be made known to our people, through an intensive educational campaign.

The farmer and breeder must be still further reached and advised. The national government is reaching out a helping hand. It is willing to do its share in an educational campaign for the eradication of this disease. It invites coöperation with state and county authorities, chambers of commerce, clubs, farmers' bureaus, farmers' and breeders' agricultural associations, etc. As soon as this coöperation has been assured an intensive campaign of publicity for the eradication of bovine tuberculosis should be launched. The plan of eradication and compensation for reacting animals is that of coöperation by the owner of the cattle, the county, state and bureau of animal industry. This is a practical proposition; it is fair to everyone concerned, but without coöperation as above outlined very little can be accomplished. Let the state of Iowa, by legislative enactment and in coöperation with the federal government, make appropriation for the eradication of bovine tuberculosis, and authorize the boards of supervisors to act jointly in its eradication from circumscribed areas. When farmers and breeders fully understand the nature of this disease, its danger to public health, as well as a large yearly economic waste, and that the government stands ready to pay its just share in making up the loss sustained by the owners in the disposal of reactors (which is the crucial point), there should be no question of their favoring adequate state laws to meet the requirements of the situation.

The present situation in Iowa makes it imperative that some action be taken in framing and recommending adequate laws

governing the inspection of our food animals prior to and after slaughter. The increasing prevalence of tuberculosis in our herds of cattle and hogs impresses the need for this class of legislation, as this disease alone is responsible for more than 50 per cent of the animals rejected as unfit for food at packing plants in Iowa where federal meat inspection service is maintained.

We are all familiar with the slogan regarding Iowa, "Of all that is good, Iowa affords the best," but in her supervision over that portion of edible meat products, the cattle and hogs, that are raised on her fertile farms and later consumed by the people, she does not appear to be doing her best. She can do better by providing and maintaining a meat inspection service which will insure her people that such products are pure and wholesome and free from diseases which are communicable from animal to man.

The federal meat inspection service covers to a considerable extent the meat products sold within the state, and from such federal service we derive great benefit, still the federal meat inspection service is intended for interstate and export trade. Some time after this federal meat inspection service was inaugurated certain foreign countries which were large importers of our meat products served notice upon our government that they would not accept our meat or its products, unless it could certify to them that they were free from certain specified diseases. This demand was met by Congress in 1891, and resulted in much improved meat inspection service, which provided for the antemortem and post-mortem inspection of all food animals intended for export or for interstate trade, the microscopic inspection of pork, and the stamping of all such inspected products by the well-known "Inspected and Passed" stamp.

The public health and economic welfare of this nation depend largely upon this act of Congress; still it has its limitations, for this valuable service is without jurisdiction over food animals which are slaughtered and consumed within the state borders. The people of this commonwealth are certainly justified in demanding from our state government the same class of meat products as were demanded from the United States by foreign governments.

We are all more or less familiar with local conditions which create a demand for legislation governing this matter. The unsightly and unsanitary slaughter house can be abolished, if recourse be taken to the Iowa nuisance statute. Dealers, however,

have no difficulty in overcoming this action. They have been known to bring for slaughter calves and sheep to their places of business and to kill their beeves at the point of purchase. They can accommodate themselves remarkably well as circumstances and local conditions permit.

Tubercular animals are bought and sold every day, creating centers for new infection. The larger portion of milk which is consumed within the state is neither from tuberculosis-free herds nor is it pasteurized. It is placed on the market simply as milk, supposedly within the law as to butter-fat content. If the Iowa statute which governs the sterilization of creamery by-products is in force we do not know it, neither do we appear to be deriving much benefit therefrom. A statute of such significance to the hog industry rigidly enforced would surely have a tendency to decrease the spread of tuberculosis in hogs. Instead, it has been observed that hogs fed creamery by-products show a larger percentage of tuberculosis than do hogs fed outside the creamery circuit. If the percentage of tuberculosis in cattle and hogs increases as it has in the past few years we will soon have become one of the worst infected states.

The aggregate amount of food which is diverted from the proper channels of commerce through tuberculosis, hog cholera, hemorrhagic septicemia, and other diseased conditions by rejection of carcasses and from state losses is enormous and represents, perhaps, millions of dollars.

There is a phase of the situation which appears more promising. Our most successful farmers and breeders are now coming to a realization of the fact that it does not pay them to feed high-priced feed to diseased stock, and from the sentiment expressed by many of them it appears certain that they would welcome any just measure which aims to protect our public health and live-stock interests. They gradually analyze the situation in their own interests and appear now to be in a more receptive mood for legislation than ever before. On the other hand are those who have had the benefit of years of state-wide publicity and education but still turn a deaf ear to it all. They are not interested although they have followed their reactors to the packing houses, the inspector has explained the nature of the disease and shown them the lesions. It is hard to convince them when they are up against a serious financial loss.

The owner of the suspected stock may know that his stock is tubercular and he may not; at all events he keeps still about the matter until it happens when sales are made from his herd of cattle, reactors are found and complaint is entered and an official test is ordered. Such suspected herds I have known to be 100 per cent tubercular. Can any one estimate the amount of infection originating and dispersed from such infected cattle for years, perhaps, before the official test is made? The unsuspecting purchaser of such stock simply must take tuberculosis along with the animals purchased and a new center of infection is established. Imagine, if you please, the result of an auction sale of such a herd. Such sales should be prohibited, unless it can be shown that all stock sold is free from all forms of contagious or infectious disease. Through the medium of sales both public and private the spread of contagious diseases has been going on for years throughout our state and if allowed to go on, in the case of tuberculosis alone the state is simply legalizing the traffic in tubercular animals and legally exposing men, women, and children to infection. I have taken considerable space in presenting the question of tuberculosis, as we cannot expect to get far with meat inspection in our cities and towns and in our rural districts until satisfactory legislation is passed and the work of eradication commenced. The sanitary municipal slaughter house, township meat rings with well-drained sanitary slaughter houses, should be encouraged. There should be maintained adequate ante-mortem and post-mortem veterinary inspection service when possible over all animals intended for consumption as food. This service conducted under state supervision would prove of great value in locating the disease-infected centers, which would mean much to the community.

The list of diseases and diseased conditions recognized under federal inspection laws which render our food-producing animals unsafe for human consumption, should be made to apply to all animals slaughtered and consumed within the state. We should aim to procure legislation and eventually maintain a meat inspection service for Iowa as near to the standard of the federal service as we can get.

Our veterinary colleges are graduating capable men, carefully educated for this work, who will welcome the opportunity of applying their talent in this broader field, which means so much to the public health and our livestock interests.

FURTHER REPORT ON LYMPHANGITIS IN CATTLE CAUSED BY ACID-ALCOHOL FAST ORGANISM.*

By J. Traum,
Agricultural Experiment Station, Berkeley, Calif.

The subject that I am scheduled to present to you this afternoon has already been discussed by me before most of you in one form or another. Report on this disease has been published in the Journal of the A. V. M. A., May, 1916.

Cases have been coming to our notice at various times, and while the percentage of cattle so affected is small we do not consider the disease a very rare one. The reason that such cases have not more often been brought to the attention of the cattle practitioner is principally that a general disturbance does not accompany this disease. It is only noticed or becomes of any concern to the dairyman when the lesions break through the skin, producing a discharging wound which is usually difficult to heal by ordinary wound treatment. In one of our cases severe lameness was also present.

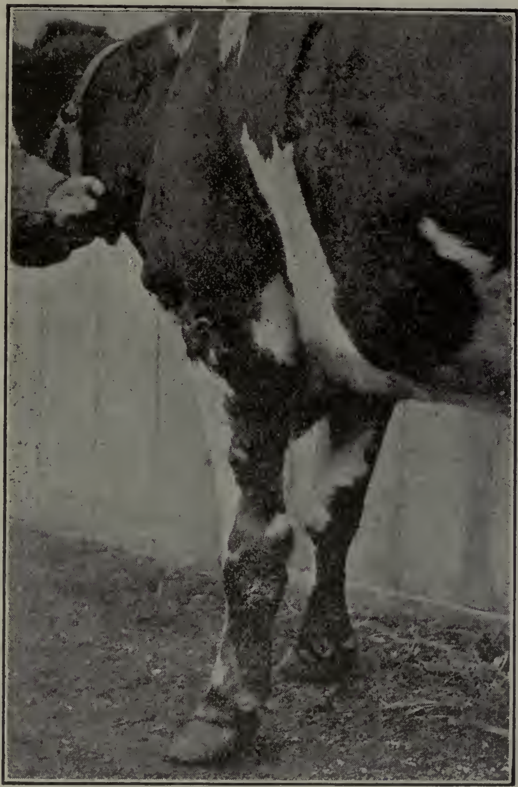
We feel that this is distinctly a disease which should interest the veterinarian since it resembles tuberculosis in many respects. It should be of further interest to you because the affected cases yield to simple operative treatment. The presentation and demonstration this afternoon is intended to act in part as an introduction to that portion of tomorrow's clinic devoted to this disease.

History of our important cases, together with a description of the lesions and reference to our laboratory work, appears to me to be an effective way of bringing the clinical picture of this disease before you.

On November 20th, 1915, I received for examination a nodule about the size of a hen's egg, which had been removed on November 18th from the subcutaneous tissue of a cow corresponding to a point about the center of the humerus. Upon section this material was found to contain in its center an area of coagulation necrosis about the size of a hazel nut, surrounded by a dense connective tissue which, in turn, was permeated by small-sized necrotic foci. Smears made from these necrotic areas and stained by Ziehl-Neelsen method, decolorizing with 20% sulpuric acid and also with 95% alcohol or with 3% acid-alcohol

* Presented at annual meeting of the California State Vet. Med. Ass'n, Fresno, Calif., June 1, 1919.

(hydrochloric), showed organisms which, in some instances, could not be distinguished morphologically or tinctorially from tubercle bacilli.



CASE 1.

The history of the cases concerned, as reported to us, is as follows: Early in October the above mentioned cow and another cow (Case 2) each presented an enlargement about one and one-half inch in diameter, back of the knee; in cow No. 1 the left knee being affected, in cow No. 2 the right. The dairyman had been treating these with tincture of iodine. This treatment produced no apparent improvement. The abscess on cow No. 1 was discharging a cream-colored, glutinous, odorless pus, containing yellowish, calcareous granules at the time when the nodular mass above mentioned was removed. It was found then that the disease process had extended on the external face of the limb up to the shoulder joint, following the course of the lymphatics, and manifesting itself in the form of corded nodular masses varying

from the size of a bean to that of a goose egg. In cow No. 2 the disease presented a similar picture, but was not so extensive, the nodules being smaller and fewer in number.

As indicated above, the microscopic examination suggested a diagnosis of tuberculosis, but the location of the lesions on the three animals (another cow, Case No. 3, having developed similar lesions on the right front leg), together with the fact that although semi-annual tuberculin tests were made no reactors had been found in this herd during a period of two years, did not warrant the diagnosis of tuberculosis. Another nodule was removed from cow No. 1 on November 24th, carefully handled, and taken to the laboratory and, upon microscopic examination, revealed the presence of acid-alcohol fast organisms which resisted the action of antiformin.

The nodules in all these animals were firm on palpation, but all the removed nodules were found upon section to contain ne-

crotic areas which in most instances had reached a stage of liquefaction. Some of the nodules were difficult to remove intact, since the pus had made its way to the outermost zones of the capsules.

The organisms in the solid necrotic areas were more plentiful than where liquefaction was present. In most instances they were 3 to 5 microns in length and beaded, appearing to be made up of two or more coccoid or bacillary members; some were fine, thin, straight rods, about 2.5 to 3.5 microns in length, others were slightly longer and slightly curved or bent, still others showed one end larger. Coccoid forms were also found. The organisms retained the color when stained by the Gram method. When stained by the Ziehl-Neelsen and counterstained by the Gram method, organisms with one or two acid fast portions and a Gram positive granule were observed. Few showed the Gram stain only.

In the middle of December a fourth cow showed four small subcutaneous nodules in back and a little below the left knee.

From Cases 1, 2 and 3, pus and nodules were obtained at various intervals and inoculated subcutaneous intramuscularly and intraabdominally into a large number of male and female guinea pigs; subcutaneously and intravenously into rabbits and chickens. Mice were fed this material. These experimental animals were allowed to live various lengths of time, with no apparent ill effects except, that in the guinea pigs and rabbits, at the points of inoculation, not infrequently there developed an enlargement which disappeared in from two to three weeks — these sometimes contained acid fast organisms. In a few of the many inoculated guinea pigs, several pin point or one or two small irregular necrotic areas were observed in the liver. One hog inoculated subcutaneously and another intraabdominally gave negative results.

Cases 1, 2 and 3 were kept under observation continuously until slaughtered.

At no time were all the nodules removed from Case 1 and for a period of over one year no discharging wounds developed. At the beginning of this year, however, one of the nodules had softened and was on the point of breaking through the skin. On February 28th a large mass of involved tissues was removed for study and on April 9th this cow was slaughtered. Aside from the lesions shown in the photograph, the left prescapular gland

contained, in the cortex, a calcareous area about 10 m.m. in diameter. Two guinea pigs inoculated with nodules from the limb, obtained at autopsy, and chloroformed 70 and 74 days respectively after inoculation, showed nothing of diagnostic value. One guinea pig inoculated with the calcareous lesion of the prescapular gland, and chloroformed 74 days afterwards, failed to show any evidence of disease.

On March 15th, 1917, all the diseased tissues were removed from Case 2 and no further development of the disease occurred. When this animal was slaughtered, May, 1917, the affected portion was found to have been replaced by connective tissue. Postmortem was otherwise negative.

On July 14th, 1916, we operated on Case 3, removing all affected tissues. The notes of this operation read: Removed several subcutaneous nodules. These varied in size from one-half pea to that of an unshelled almond. At the point of the shoulder, several nodules formed a large conglomerate mass. On account of the thin walls of the capsules it was difficult to dissect out the nodular masses without permitting the enclosed glutinous and cheesy material from escaping from the nodule.

In May, 1917, this animal (Case 3) was sold to the butcher. Autopsy findings were again negative, excepting for a slight thickening at the operative field.

Case 4 was operated upon February 20th, 1916, removing the four small encapsulated necrotic masses. No reappearance of disease was reported in this animal.

On February 12th pus which had been obtained by Drs. Hill and Caldwell of Oakland from the vicinity of the fetlock joint of the left hind leg of a cow (No. 5) was brought to my attention by Dr. F. W. Wood of the Cutter Laboratory. This pus appeared very similar to that obtained from cows 1, 2 and 3. Microscopic examination in this case also showed similar acid-alcohol fast organisms. Drs. Wood, Hill and myself visited the dairy owning cow No. 5 on February 19th and found a sixth case. In this last case we found a soft tumor, about one inch in diameter, back of the right knee, and nodular masses connected by cords of infected channels extending upward to a point below the shoulder on the outside of the leg, very much like those found in the other cases. In case No. 5, at one point, the pus had made its way to the surface from a small nodule, presenting an ulcer which, in appearance, was like the buds found on the limbs of farcy horses.

Drs. Caldwell and Hill operated on this case, carefully dissected out the diseased tissues. Guinea pigs and rabbits were inoculated with material from this case with negative results excepting that one guinea pig, chloroformed 25 days after inoculation, showed many abscesses in the liver, in which indistinct acid fast organisms and Gram positive beaded rods and coccoid forms were found.

The clinical picture thus far described suggested streptothricosis (Farcin du bœuf). The presence of acid fast organisms did not tend to weaken this diagnosis, but rather supported it, since bacillary acid fast forms have been described as being present in this disease. In all our work, however, we were unable to find any branching filamentous forms. The large number of tubes of varied culture media inoculated from these cases have thus far failed to yield any definite results. Animal inoculations have up to date been of no assistance in establishing a def-

inite diagnosis. They, however, eliminated mammalian tuberculosis, since a large number of guinea pigs inoculated with material, which, as evidenced by microscopic examination, contained a great many acid fast organisms, failed to develop tuberculosis even when allowed to live for many months.

At this time the allergic tests were resorted to in our attempt to establish a diagnosis, but this procedure failed to clear up the situation.

All six cows were tested intradermally both with a streptothrichin, prepared from Streptothrix nocardii grown for five weeks on 4% glycerin bouillon and prepared after the manner of Koch's O. T. and used in 20% strength, and with a 50% dilution of avian tuberculin (the latter kindly furnished by Dr. Van Es). Cows 1, 2 and 5 gave distinct reactions to the avian tuberculin, while cow 3 gave a doutbful reaction. Case 1 gave an equally strong reaction to the streptothrichin, while cases 2 and

5 failed to give a decided reaction to this test. Cases 4 and 6 failed to react to either of these tests. Cases 1, 2 and 3 were ophthalmically tested with streptothrichin and Case 1 again gave a marked reaction, while the others were negative. Cases 1, 2, 3 and 4 were tested with ordinary veterinary tuberculin, 1 and 2 being tested subcutaneously with 10% O. T., and the others intradermally with 50% O. T., and the results were negative in all cases. All four were then given the ophthalmic test for tuberculosis and again the results were negative. The failure thus far to grow the organism and the reaction to avian tuberculin also suggested an organism very much like the one responsible for Johne's disease (Enteritis paratuberculosis). The usual clinical manifestations of this disease, however, have never been found in either of these herds nor in other herds in which the disease was later studied.

An intradermal tuberculin test was applied to Cases 1, 2 and 3. Case 2 reacted with swelling the size of two almonds, while Cases 1 and 3 were negative. In July, 1917, Case 1 gave positive swellings in both subcaudal folds. First, an injection was made with tuberculin and 36 hours later the opposite fold was injected with avituberculin. Case 1 was later again tested, once with the subcutaneous and once with the intradermal method, giving negative results to both tests. The last two tests were six months apart.

On November 1, 1917, a seventh case came to our attention. This animal gave a definite reaction to the intradermal tuberculin test which persisted for at least 120 hours. A string of well-defined subcutaneous enlargements and connecting cords were found on the left fore leg, extending above the knee. One of the softened nodules was opened and scattering acid fast organisms were found in smears from this material. Guinea pigs and culture media inoculated with this material yielded results similar to those described above. No autopsy was made in this case.

Case 8. Another case came to our notice December 21st, 1917. This animal was lame on the right forelimb and showed a large discharging wound on the outside, a little above the center of the radius. On February 6th, 1918, we removed the lesions responsible for the discharging wound and the affected tissue above this area. We did not, however, remove all the nodules below this mass nor did we remove the scattering nodules on the left

foreleg. The wound healed rapidly. A photograph taken May 29th, 1919, showed that there was no recurrence of the disease in the operated area. No other discharging wounds have thus far developed.

Notes on this case read: A large number of nodules which were on the right front leg, extending from the fetlock to a point on the shoulder were removed. The nodules were small, varying in size from one-sixteenth to one-half inch in diameter and were, in most cases, surrounded by distinct capsules. They appeared in the course of long tortuous cords which frequently branched to the side. On section, the nodules showed yellowish glutinous pus containing some calcareous material — the smear stained for acid fasts revealing but few such organisms; when, however, treated with 2% NaOH solution, no difficulty was experienced in finding acid-alcohol fast organisms.

In August, 1917, this cow reacted to the intradermal test and was negative to the subcutaneous test January, 1918. This animal has been associated for some time with tuberculous cattle.

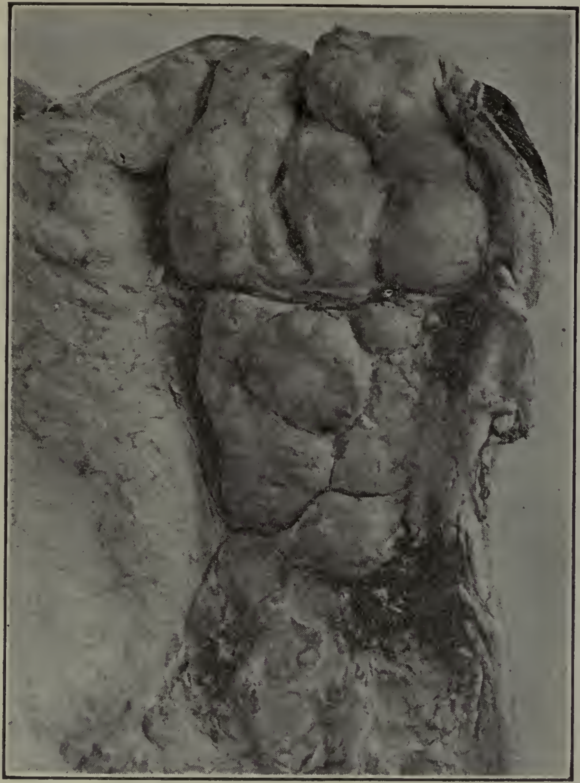
The inoculation of guinea pigs, rabbits and media of various kinds with material from this case also failed to reveal anything of diagnostic value.

Case 9. On February 18th, 1918, our attention was called to a discharging wound on the left foreleg in back of the cannon bone, about halfway between the fetlock and the knee joints. About this discharging wound there was a mass of nodules connected by corded channels containing glutinous pus and extending from this mass to nodules above the knee and below into the tendon sheaths. On February 25th, 1918, this case was operated upon. We made an incision extending almost the entire length of the cannon bone and removed all the involved area excepting where the line of infection carrying pus extended into the tendon sheath.

Guinea pigs, rabbits, and a nine-months-old heifer calf were inoculated with material obtained by operation. Results were negative.

This animal was tested intradermally February 20th, 1918, and showed a reaction at 60 hours; at the 84th hour only an appreciable thickening was present. To all external appearances this animal was cured; but she could not be gotten with calf and so was slaughtered June 3rd, 1918. The only evidence of disease detected was present in the operated limb where a few half-pea-

sized necrotic foci were found attached to the inner surface of the skin just above the fetlock. (Specimen exhibited).



LESIONS FROM CASE SHOWN AT CALIFORNIA STATE VETERINARY MEDICAL ASSOCIATION MEETING—FRESNO, CALIF., JUNE 1 AND 2.
Several lower nodules removed for inoculation purposes.

Two more cases came to our notice (Cases 10 and 11) in March, 1918. These showed at the 96th hour reactions to the intradermal tuberculin test. They were slaughtered March 6, 1918, and the only lesions found are shown in the photographs.

Guinea pigs and rabbits inoculated with material from this case failed to reveal anything of diagnostic value. These two, with one other cow, were the only reactors in a herd of 68 cows. Upon examination before slaughter, all three animals appeared to be affected with this disease, one only very slightly. All three were slaughtered and no visceral or lymph node lesions were found in any of these animals. I was assisted in these autopsies by Dr. Hart and the inspector.

A twelfth case that I desire to bring to your attention showed subcutaneous nodules and connecting corded lines of infection along the thoracic and abdominal wall. This animal was killed April, 1919, and the above-mentioned were the only lesions found. This animal was tested intradermally five days before slaughter; a strong reaction resulted which was still present at the time of slaughter. Two guinea pigs inoculated with material from the subcutaneous nodules, obtained at autopsy, and chloroformed 74 days after inoculation showed no lesions.

A Holstein cow affected with this disease was brought to Fresno, Calif., for demonstration purposes. This cow was given intradermal tuberculin test May 26th, 1919; 72 hours later there was a large pea-size swelling; a week after injection she showed a pea-sized swelling. Dr. Hayes operated upon this case June 2nd, removing two almond-sized nodules on the outside of the left foreleg above the knee. A larger mass of conglomerate nodules was present below the knee which extended to the fetlock. These were purposely saved for further study. The removed nodules and many others were soft on palpation. In fact, one nodule below the knee had broken through the skin. This cow was expressed to Berkeley and on her way to pasture accidentally broke her back. Post-mortem showed an abscess in the lung caused by penetrating wire. No other lesions were found except those shown in the photograph.

The presence of lesions of this disease has not been definitely established in any visceral organ. In fact, in only one was it suspected; a cow which showed strong positive complement fixation and reacted to intradermal tuberculin test, was autopsied and several of the mesenteric lymph nodes showed what then appeared to be tuberculous infection. Guinea pigs inoculated with this material, however, failed to develop tuberculosis. No other lesions were found in this cow. Acid fasts were not searched for in this case.

Many other cases came to our notice but the above will suffice to bring the matter to your attention.

The complement fixation test, using the tubercle bacilli as antigen, yielded a high percentage of positives in the limited number tested. This is not strange, since group reactions with acid fast organisms have been obtained by other workers. These samples were included in the course of fixation tests made in coöperation with Dr. Jean V. Cooke upon several hundred sera from tuberculous and non-tuberculous cattle.

In the previous pages I have stated that our media inoculation yielded nothing definite. Recently, however, more encouraging results developed. Material obtained from Case 1, February 28th, 1919, at the time of operation, yielded, on cooked blood agar, an acid fast, exceedingly pleomorphic organism. The growth extended from the piece of inoculated tissue. The organism now grows readily at 37° C., and fairly well at 26° C., on plain and glycerine bouillon and agar, raw and cooked blood agar, Lœffler's blood serum, not so well on potato nor on alkaline glucose broth. It produces neither gas nor acid in glucose, lactose, maltose, mannite, or saccharose media. On glycerine bouillon it develops a membrane on the surface which wrinkles only in old cultures; the medium remains clear except for occasional flakes. Growth on the surface extends on the sides of the tube; several weeks' old cultures show heavy sediment. When concentrating culture grown on this medium, the characteristic tuberculin odor is noticed; it is, however, not so marked as in hot, concentrated tuberculin.

Orange-colored pigment has been observed in several tubes of glycerine agar and glycerine bouillon, seven to eight weeks after inoculation.

The form and staining reactions of this organism vary considerably even in smears made from the same colony. Sometimes it is distinctly diphtheroid. At other times it shows coccoid appearance. This was more often noticed when grown on agar. Fine rods, 3 to 5 microns or longer, bent or curved, often made up of shorter elements, are most frequently observed. Rods not of the same thickness throughout, rods with one or both ends slightly thicker, or thicker in the center, and rods with pointed ends may be seen.

They are Gram positive; acid fast when decolorized by Gabbett's method, showing, however, few greyish or blue organisms. When decolorized by acid-alcohol, a larger number give up the fuchsin stain. They do not, as a rule, stain uniformly.

The pathogenicity studies of this organism have thus far yielded the following results: Two guinea pigs inoculated subcutaneously, and two inoculated intraabdominally with glycerine bouillon cultures, each showed at the end of a week subcutaneous swellings about 1½ inches long by ¾ inch thick. One of the intraabdominally inoculated pigs was chloroformed 26 days after inoculation. The local swelling had decreased in volume to about

one-fourth of what it was at a week after inoculation. Upon section, this swelling showed an abscess, containing glutinous pus, which involved the abdominal muscle but did not extend into the peritoneal cavity. No other lesions in this animal except few pin-point greyish areas in the liver were found. Culture from the abscess showed distinct growth in three days which was similar to the inoculated culture. Smears made from this pus stained with steaming carbol-fuchsin and decolorized by Gabbett's method showed exceedingly large number of acid fast organisms difficult to distinguish from the tubercle bacilli. When decolorized by acid alcohol and counterstained by methylene blue the same picture was seen except that here and there a blue organism was observed.

The other three guinea pigs are still alive at this writing. The local lesions have practically disappeared.

Two rabbits inoculated with the same culture showed at the end of a week bean-sized subcutaneous swellings. A month after inoculation these swellings had increased to the size of a hen's egg and at the back of the leg a thickening about three-quarters by one-half inch had developed. Pus withdrawn with a syringe yielded results the same as pus from the guinea pig described above.

Two six-month-old calves were inoculated subcutaneously above and back of the knee; a third was inoculated intravenously. Sixteen days after the inoculation, one of the inoculated calves showed a soft, round swelling at the point of inoculation about two inches in diameter. This swelling did not materially change in size at the end of a month. Smears made from pus withdrawn from this lesion showed organisms similar in morphology and staining reactions to those obtained from the guinea pig — cultures showed growth at four days.

White rats inoculated subcutaneously with the same culture showed no local lesions.

The piece of tissue from which the above-described organism developed was removed from the test tube. Portion of it was inoculated into one guinea pig subcutaneously and the other portion into a second guinea pig intraabdominally. The former was chloroformed two months after inoculation — autopsy revealed no lesions. The latter, chloroformed 57 days after inoculation, showed a few small necrotic areas on liver. Smears revealed no acid fast nor other organisms. These two guinea pigs

developed local swelling, about 1 inch long and ½ inch thick, which, however, had disappeared when chloroformed.

Only in one other instance (Case 4) was a similar organism isolated. After three generations on glycerine bouillon, we lost it. Up to that time, we had no opportunity to do very much with it.

CONCLUSIONS.

The findings and observations recorded in this paper indicate that we are dealing with a disease which resembles tuberculosis in the character of the lesions and by the presence of acid-fast organisms in the lesions. It further resembles tuberculosis by the fact that a large percentage of cases under discussion give positive reactions to the intradermal tuberculin test; a number of such reactors have been autopsied (including some not recorded above) and in none of the cases did we find tuberculosis; in fact, in some of the reactors tuberculosis could be definitely eliminated.

That it is not tuberculosis is satisfactorily demonstrated by the failure to produce a single case of tuberculosis in the large number of guinea pigs inoculated with materials from the above-described and other cases. The organism isolated from lesions and described here as the probable causative agent resembles tubercle bacilli to some extent, differing, however, sufficiently in the character and speed of growth and microscopic appearance of smears from the cultures to easily differentiate it from tubercle bacilli.

STUDIES ON ANTHELMINTICS.

III. CHLOROFORM AS AN ANTHELMINTIC.

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That chloroform is valuable as an anthelmintic for removing hookworms—what we may call an uncinaricide—has been claimed by Allesandrini on the basis of clinical experience with human patients, and has been experimentally shown in tests against hookworms of the dog by Schultz and by Hall and Foster. Chloroform is a constituent, and the active uninarici-

* Resigned March 27, 1919.

dal ingredient, of Hermann's mixture, which contains chloroform and castor oil combined with oleoresin of male fern or oil of eucalyptus, and is also present in a number of proprietary and trade preparations.

In experiments on dogs, Hall and Foster found that 0.1 m. p. k. (mil per kilo) was too small a dose for this drug, and experiments in this laboratory indicate that at least 0.2 or 0.3 m. p. k. should be used. This naturally raises the question as to whether chloroform is a safe drug to use and what constitutes a safe therapeutic dose and a lethal dose.

It has long been known that the administration of chloroform to produce anesthesia was sometimes followed by a delayed poisoning in which pathological alterations of the liver were a prominent condition, sometimes accompanied by degenerations of the kidneys and heart. Bevan and Favill referred the toxic effects of delayed chloroform poisoning to toxins, which could not be eliminated, from the liver cells. They noted the presence in the blood and urine of acetone, diacetic acid and betaoxybutyric acid. Opie and Alford found that fats increased in susceptibility to chloroform poisoning, while carbohydrates afforded a measure of protection against it, which accords with the clinical experience of English surgeons. Offergeld thought that death in delayed chloroform poisoning is due to nephrolysis, as a result of the action of the chloroform on the kidney cells. Wells thought that the liver changes are due to the effect on the liver of poisons that destroy the synthetic functions of the liver cells without destroying their autolytic ferments, with a resultant autolysis of the liver cells, indicated by the presence of free amino acids, purins, proteoses, peptones and polypeptids in the liver. Whipple and Hurwitz have found that fibrinogen may be almost eliminated from the circulating blood in chloroform poisoning, subsequently reappearing after the repair of the liver, which takes place usually within 10 days. Whipple and Sperry find that chloroform anesthesia for one or two hours invariably causes some central liver necrosis and note that chloroform anesthesia for 35 minutes in man may cause almost complete liver necrosis with a fatal termination; the essential change is extensive necrosis and fatty degeneration of the liver; there may be numerous ecchymoses and hemorrhages into the peritoneum and upper intestinal tract; the pancreas may show fat necroses and ecchymoses; in pregnancy there

may be placental necrosis with separation and hemorrhages; the liver necrosis is microscopically visible only after 6 to 10 hours; they find that dogs die in 1 to 4 days, with symptoms of intoxication and vomiting, sometimes vomiting blood. Schoenhof has summarized 29 cases of delayed chloroform poisoning in man, of which 17 recovered and 12 were fatal. He cites some experiments on dogs as follows:

Dog 1, weighing 5.5 kilos, was given 7 mils of chloroform (a little over 1.27 m. p. k.); after 5 minutes dog was restless, salivated and staggering; recovered in a half hour. Next day, this dog was given 20 mils of chloroform (a little over 3.63 m. p. k.); symptoms more pronounced, dog vomiting and falling; dullness, sleepiness and vomiting of blood lasted 2 days; dog recovered. This animal's total dose was practically 5 mils per kilo.

Dog 3, weighing 4.5 kilos was given 50 mils of a mixture of absolute alcohol (28 parts), chloroform (40 parts), and camphor (20 parts); died in 15 minutes. The chloroform dosage here is 5 mils per kilo, without considering the other drugs used, and the other drugs must have contributed largely to the toxic effects.

Dog 4, a medium-sized dog (he regards a dog weighing 5.5 kilos as a medium-sized dog in a previous experiment; Hall and Wigdor found a 10-kilo dog to be the average size) was given 35 mils of chloroform (about 6 m. p. k., apparently); dog vomited and was dull; the next day the dog was given a mixture of 5 mils of alcohol and 20 mils of chloroform (apparently about 3.6 m. p. k.) and died almost immediately. Apparently this dog had almost 10 mils per kilo, in addition to the alcohol.

Graham believes that the necrosis following chloroform is due to its breakdown in the body with the formation of hydrochloric acid, a belief supported by the increase of salts in the urine and by the inability of ether and chloral hydrate to parallel the changes caused by chloroform, dichlormethane and tetrachlormethane; alkalis inhibit the production of these lesions. Farquhar has used sodium bicarbonate by mouth, by rectum, subcutaneously and intravenously, in a very serious case of delayed chloroform poisoning in man, with recovery, which bears out Graham's findings. Jensen finds adrenalin valuable in cases of chloroform poisoning. Whipple and Speed find that in normal animals the liver eliminates from 45 to 65

per cent of the phenoltetrachlorphthalein injected intravenously, but where the liver is damaged, as by chloroform, phthalein appears in the urine; in one of their experiments, a 21-pound dog (a little less than 10 kilos) was given 15 mils of chloroform, followed 4½ hours later by 10 mils additional, a total of over 2.5 mils per kilo; the dog was still alive 4 days afterward (no further data given). Simonds finds that feeding sugar in cases of phosphorus or chloroform poisoning furnishes cerbohydrate essential to protein metabolism, and supplies easily oxidized material to the liver, in which the glycogen is depleted, inhibiting antolysis.

It appears from the experiments noted in the foregoing, that dogs may survive the oral administration of 5 mils of chloroform per kilo of body weight, when given in 2 doses on successive days. Evidently doses of 0.3 mils per kilo should be readily tolerated as a therapeutic dose of chloroform by dogs in reasonably good condition.

The following experiments were performed in this laboratory:

Dog No. 19, weighing 22 kilos, was given chloroform at the rate of 0.1 m.p.k. in 30 mils of castor oil. The dog passed no worms; was killed the fourth day; had 1 ascarid, 3 hookworms, and 12 tapeworms. Efficacy against ascarids, hookworms and tapeworms, 0 per cent. Digestive tract in bad condition.

Dog No. 12, weighing 6 kilos, was given chloroform at the rate of 0.2 m.p.k. in 30 mils of castor oil. The dog passed 7 hookworms; was killed the fourth day after treatment; had 1 hookworm and 6 tapeworms postmortem. Efficacy against hookworms, 87.5 per cent; against tapeworms, 0 per cent. Digestive tract in good condition.

Dog No. 89, weighing 9 kilos, was given chloroform at the rate of 0.2 m.p.k. in 30 mils of castor oil. The dog passed 6 hookworms; was killed the twentieth day; had 75 hookworms and 3 ascarids. Efficacy against hookworms, 7 per cent; against ascarids, 0 per cent. Digestive tract in good condition.

Dog No. 115, weighing 10.5 kilos, was given chloroform at the rate of 0.3 m. p. k. in 30 mils of castor oil. The dog passed 2 hookworms; was killed the fifth day; had 2 hookworms postmortem. Efficacy against hookworms, 50 per cent. Digestive tract in fair condition.

Dog No. 118, weighing 12.5 kilos, was given chloroform at the rate of 0.3 m.p.k. in 30 mils of castor oil. The dog passed 1 hookworm; was killed the seventh day; had 2 hookworms, 3 whipworms and 43 tapeworms postmortem. Efficacy against hookworms, 33 per cent; against whipworms and tapeworms, 0 per cent. Digestive tract in fair condition.

Dog No. 58, weighing 3 kilos, was given chloroform at the rate of 0.4 m.p.k. in 30 mils of castor oil. The dog passed no worms; died the second day after treatment; had no worms postmortem. Digestive tract in bad condition. This dog was a weak pup, which accounts for its failure to tolerate this dose.

Dog No. 83, weighing 9.5 kilos, was given chloroform at the rate of 0.4 m.p.k. in 30 mils of castor oil, and 5 hours later was given 30 mils of simple syrup in accordance with the idea that carbohydrates afford protection against chloroform poisoning. The dog passed no worms; was killed the thirteenth day; had 12 tapeworms postmortem. Efficacy against tapeworms, 0 per cent. Digestive tract in fair condition.

Dog No. 61, weighing 6 kilos, was given chloroform at the rate of 0.666 m.p.k. in 30 mils of castor oil. The dog passed no worms; was killed the fourth day; had no worms postmortem. Digestive tract in bad condition.

Dog No. 87, weighing 7 kilos, was given chloroform at the rate of 1.0 m.p.k. in 35 mils of castor oil. The dog passed no worms; was killed the twenty-seventh day; had no worms postmortem. Digestive tract in good condition.

Dog No. 88, weighing 15 kilos, was given chloroform at the rate of 2.0 m.p.k. in 40 mils of castor oil by stomach tube. The dog passed 1 hookworm; was killed the fifty-fifth day; had 1 tapeworm postmortem. Efficacy against hookworms, 100 per cent; against tapeworms, 0 per cent. Digestive tract in good condition. This dog was put in a chloroform box with four others; the others died in an hour, whereas this dog survived almost 7 hours and required an additional amount of chloroform in the box to kill it. This experiment was published in a previous paper by Hall.

Hall and Foster at Washington found that chloroform in doses of 0.2 m.p.k. removed 474 out of 830 hookworms from 5 dogs, an efficacy of 57 per cent. All the work done indicates that the efficacy of chloroform against ascarids, whipworms and tapeworms is too little, actually and in comparison with other

drugs, to warrant its employment against these worms. In single dose to remove hookworms it has given better results than single doses of oil of chenopodium or thymol in dogs, but the results in all cases are somewhat uncertain. In human medicine, chenopodium has been given, as a rule, in 3 doses at hour intervals, and it seems likely that some such method of treatment, repeated doses of chloroform or chenopodium, will be necessary to remove hookworms from the dog. It has the advantage that the treatment may be stopped after the first or second dose if the animal shows signs of intolerance. Another possibility is to give small doses daily, or at intervals of 2 or more days, for a number of days. The writer has experimentally tested this once with chloroform as follows:

Dog No. 280 weighing 11 kilos, was given 15 minims of chloroform in a soft gelatine capsule, followed immediately by 15 mils of castor oil. Three days later the treatment was repeated. Two days thereafter it was repeated. Two days after this, it was repeated again. Four days later the dog was killed. It had 6 hookworms, 4 whipworms and 17 *Dipylidium* postmortem. Efficacy against hookworms, whipworms and tapeworms, 0 per cent. This dog received a total of a dram, approximately 4 mils, of chloroform in 7 days. It is possible that the use of the soft gelatine capsule as a container for chloroform is partly responsible for the failure of the treatment, as these capsules did not give in this or other tests the same efficacy that had been obtained by the use of chloroform dissolved in castor oil. It is probable that the dose used was too small, being less than 0.1 m.p.k.

Tests of chloroform administered in the soft capsule were made as follows:

Dog No. 256, weighing 22.5 kilos, was given 7 soft capsules, each containing 15 minims of chloroform — a dose rate of 0.3 m.p.k.—followed immediately by 30 mils of castor oil. The dog passed 1 ascarid and was killed the sixth day after treatment. There were no worms postmortem. Treatment 100 per cent effective against ascarids. Digestive tract normal.

Dog No. 265, weighing 12.5 kilos, was given 4 of these 15-minim capsules—a dose rate of 0.3 m.p.k.—followed immediately by 30 mils of castor oil. The dog passed no worms and was killed the sixth day after treatment. Four hookworms were found postmortem. Treatment 0 per cent effective against

hookworms. Digestive tract showed pinpoint petechiæ in the greater curvature of the stomach and in the lower ileum.

The reason for the failure of the chloroform to remove any hookworms from dog No. 265 is not evident. It might be thought that the capsules were hardened by the action of the chloroform and failed to open until they had passed the upper intestine where the worms were, but the presence of petechiæ in the stomach points to a different conclusion. Moreover, in the case of dog No. 256, the fact that the capsules opened in the stomach was evident from a marked chloroform narcosis exhibited by the dog within 45 minutes after the administration of the capsules.

In the 13 experiments discussed here, the digestive tract was normal and in good condition in 6 animals; in fair condition, that is, with only limited areas of moderate inflammation or petechiæ, in 4 animals; and in bad condition, with considerable inflammation or hemorrhage, in 3 animals. The dogs with digestive tracts in good condition were animals that had received comparatively small single doses (0.1 to 0.3 m.p.k.) and been killed 4 to 6 days after treatment (Nos. 12 and 256) or 4 days after the last dose in repeated treatments (No. 280), or were animals that were killed 21 to 55 days after single treatment with doses of 0.2, 1.0 and 2.0 m.p.k. (Nos. 89, 87 and 88). Those with the digestive tract in fair condition were animals that had been killed 5 to 17 days after treatment with 0.3 to 0.4 m.p.k. (Nos. 115, 118, 265 and 83). Those with the digestive tract in bad condition had been killed or had died (No. 58) in 2 to 4 days after treatment with 0.1, 0.4 and 0.666 m.p.k. (Nos. 58, 61 and 19); the one that died was weakly and sick before treatment. Hepatic necrosis was present in dogs Nos. 118, 58, 83 and 61, with doses ranging from 0.3 to 0.666 m.p.k., and killed or dying 2, 4, 13 and 17 days after treatment.

A consideration of available facts to date with reference to chloroform as an anthelmintic, indicates the following: That in administrating chloroform to dogs for removing hookworms, doses of 0.1 m.p.k. are too small and that doses of 0.2 to 0.3 m.p.k. should be used; that in the higher dosage, chloroform will have an efficacy of perhaps 50 per cent, which is better than single doses of thymol or santonin will have; that normal dogs will survive doses of 3.65 m.p.k. in one dose and 5.0 m.p.k. in 2 doses on 2 successive days; (Schultz states that 2 doses of

0.3 m.p.k. in 10 mils of castor oil each, given the same day, will kill; possibly the dogs in his experiment were not in good physical condition or other factors were involved; that normal dogs will show hemorrhagic gastro-enteritis for at least 4 days after doses of 0.4 to 0.6 m.p.k.; that the digestive tract will be in fair condition in 5 to 7 days after doses of 0.3 to 0.4 m.p.k.; that there will be entire recovery of the digestive tract in 1 to 2 months after doses of 1.0 to 2.0 m.p.k.; and that hepatic necrosis may persist microscopically for over 2 weeks in animals given 0.3 m.p.k. Chloroform appears to be safe and more effective against hookworms in single dose than any other anthelmintic, but in doses of 0.2 m.p.k. it is only about 50 per cent effective and repeated treatment is necessary for removal of all hookworms present.

DEAN MOORE'S PORTRAIT PRESENTED TO CORNELL UNIVERSITY AT SEMI-CENTENNIAL CELEBRATION.

One of the unique and important features of the semi-centennial celebration, held at Cornell University at its recent commencement, was a conference at each of the colleges, where suggestions, in the form of committee reports from alumni, were presented on topics concerned with the improvement of the curriculum, in increasing the efficiency of the instruction and the strengthening generally of the relation of the University with the public.

Among these was, the State Veterinary College, where the following reports, showing the wide range of the subjects, were submitted and discussed.

1. The Teaching of Animal Husbandry. C. W. Bay, Chairman.
2. Veterinary Training Preparatory for the Army. P. A. Fish, Chairman.
3. Instruction in the Fundamental Sciences. L. L. Buchanan, Chairman.
4. Teaching of the Applied Subjects. J. G. Wills, Chairman.
5. Coöperation of the College with the Live Stock Interests of the State. Cassius Way, Chairman.
6. Methods of Teaching Veterinary Subjects. C. P. Fitch, Chairman.

7. Additional Subjects or Departments. J. F. Shigley, Chairman.

Before the presentation of the program, the Governor of the State, Alfred E. Smith, appeared and in fitting but brief remarks expressed his interest in the work that is being done and his desire to coöperate and to promote the live stock as well as the agricultural interests of the State.

DR. V. A. MOORE

In the midst of the general program President Schurman entered, and Dr. Birch, remarking that the meeting was unique in more ways than one, asked that Dr. Cassius Way be permitted to take the floor temporarily. In the presentation of Dean Moore's portrait to the University the following remarks were offered:

Dr. Way: It is a great pleasure for us, as alumni, to be present today at this celebration on the fiftieth anniversary of the

founding of Cornell University, which, by the way, is the fiftieth anniversary of the beginning of better veterinary education in America, for it was through the broad vision of Ezra Cornell that the foundation for the work of this college was laid.

It is a singular honor for us to present to the University, through our president, a portrait of our esteemed director, who occupies a unique place in the realm of science. Those who know him in this field admire and respect his ability, while those of us who are fortunate enough to know him as a teacher have learned to love him.

In the field of veterinary medicine he occupies a pinnacle; at this time he has the honor of being the president of our American Veterinary Medical Association, the greatest organization of veterinarians in the world. He was recently honored with an honorary degree from one of our great sister institutions, Syracuse University.

The University, and especially this college, has been fortunate all these years in having the guidance and association of Professor Moore, and we trust that we may have his guidance and his counsels for many, many years. We have come to know him as the thorough scientist, the great teacher, and the true friend.

Mr. President, on behalf of the alumni of this college I have the great honor to present to Cornell University a portrait of our beloved director, Veranus Alva Moore.

President Schurman: It is a great pleasure, on behalf of the University, to accept this portrait of Dr. Moore, director of this college, which the alumni have presented. I deem it a great privilege and find it a great satisfaction to be present on this occasion. I did not wish to miss this, because I have come to entertain a great friendship and a very great affection for Dr. Moore. We have worked together in great harmony. I should be very sorry if such a piece of great good fortune should come to him and I not be here to share it. These are not things we usually say to one another. Men do not wear their hearts on their sleeves. It is not easy for me to speak of the great esteem in which I hold Dr. Moore, for it is not only regard and esteem, but the deepest friendship, I feel for him.

I have the honor to represent the University in which he represents one of the colleges. I regard Dr. Moore as one of the great educators in the University. I do not believe that there is a man anywhere in this University who has wiser and sounder

ideas on education. While he belongs to you alumni, he also belongs to the University as a whole, as a co-worker and a co-educator. I place very great value upon the sentiments of Dr. Moore on every question of University policy. That represents his standing in this University. You know what he has been to you. As the chairman of the committee said in presenting this portrait, he is a leader.

When we lost, through retirement, one of the most eminent men in veterinary science (whom I see here, and whom we all hope will be spared for very many years to us), I remember I felt how hard it would be to find a man who would fill that very large place. Dr. Moore has filled that place. No one realizes that more than his great predecessor. It has been the good fortune of the University that it has had such great directors for this college.

There are certain qualities which must be possessed by a man at the head of a college. The director must be a gentleman. That goes without saying. He must have tact, he must have sympathy. You know, through these years how Dr. Moore has succeeded so conspicuously in fulfilling these requirements.

I do not know whether you know how large a work he has done in presenting the work of this college to the leaders at Albany and elsewhere. There is no man I know in the State, dealing with the Legislature, who enjoys their confidence more fully and who has more influence with them. That is because there is a perfectly frank and honest procedure. He puts all the cards on the table and never asks for more than he feels the college needs and can use wisely. The chairman of one of the most important committees in the Legislature said to me in reference to the veterinary college: "It is the most economical institution in the State of New York."

I am glad to be with you, my young friends of the Veterinary College, on this splendid day. You are not waiting until Dr. Moore is old, but while he is in the full flush of his powers you have chosen to honor him. On behalf of the University I wish to express to you my appreciation of the fine sentiment that has animated you in this worthy enterprise.

Dr. Moore: There are times when it is difficult, if not impossible, to find words to express adequately one's feelings. I find myself in such a situation now. Had I known, I fear I would not have advocated the conference so persistently. If this

has been planned to surprise me, and incidentally to embarrass me temporarily, it has been a great success. If it is a reminder that the "chloroform" stage is approaching, I will tell you that ti is already here. If, however, it has been to assure us of your loyalty to the teachings of this college and the things for which it stands, it is most gratifying, and confirms the opinion I have held for many years.

I have felt for a long time that the alumni were true to the principles upon which this college was established. I believe that ultimately they will triumph. I believe that the time will come when there will be a veterinary profession in this country that will stand second to none in its loyalty to truth and devotion to service. But meantime it seems that the sum of our duty is to fight for the cause we have honestly in hand and with the weapons that we ourselves have forged. That is being done in New York State. Dr. Law, the father of scientific veterinary education in America, and who is with us today, can testify to fifty years of endeavor with the men who received their inspiration from him, and also of the advances that have been made.

The progress that the college has made has been due to the hard work and coöperation of the faculty and the standards your professional services have created. With the many forces that are tending to make a better veterinary profession, one man can do but little. The credit belongs to all.

I would not be human if I did not feel deeply this expression of friendship. I assure you I appreciate it and thank you one and all.

P. A. FISH.

Dr. Wm. H. Lowe of Paterson, N. J., was elected Alumni Representative to the Council of the General Alumni Association of New York University.

Chancellor Brown of New York University, in his address at the Commencement Exercises on June 18th, paid a high tribute to the response of the Alumni and undergraduates, in the stressing needs of New York University during the war period. He stated that more monies and endowment funds had been given and pledged during the past year than in the preceding six years. The demands for enlarged service is a rich testimonial of appreciation of her valued educational opportunities.

CLINICAL AND CASE REPORTS.

METASTATIC MELANO-SARCOMA.

From Veterinary Division, Kans. State Agr. College.

A male dog 8 years old, presented as a patient at the Veterinary clinic of the Kansas State Agricultural College on the 3rd day of April, 1919, with the following history:

About one month previous a small nodule on the animal's sheath first attracted the owner's attention. In a short time other nodules appeared until the entire sheath was involved and extensively swollen.

MELANO-SARCOMA.

Symptoms: Temperature 103.2, pulse 120, respirations 50.

The sheath was extensively swollen and covered with nodular enlargements. Urination was but slightly interfered with. The inguinal lymph glands were also enlarged. A tentative diagnosis of melanosis and possibly carcinomatosis was made and an unfavorable prognosis given. No treatment was applied.

The animal was killed on April 12th, 1919, and Dr. L. R. Vawter, Instructor in Pathology, Division of Veterinary Medi-

cine, Kansas State Agricultural College, submits the following post-mortem report:

DIAGNOSIS METASTATIC MELANO-SARCOMA.

Skin in region of sheath exhibited small nodules on the surface ranging in size from a pea to a hazel nut.

The sheath greatly indurated and paraphymotic. The penis exhibited material swelling and the skin slightly roughened by small granulations. The prostate gland was about five times the average size and upon section was uniformly black in color.

LUNGS OF DOG AFFECTED WITH MELANO-SARCOMA.

The kidneys each contained two melanotic nodules on each surface and the cut surface also exhibited two or three in each kidney. These nodules averaged one-fourth inch in diameter.

The spleen exhibited five nodules along the edges of about one-sixteenth inch in diameter. The lungs exhibited very numerous melanotic nodules throughout and many very prominent nodules about the size of a pea both on dorsal and ventral surfaces.

Many minute almost imperceptible melanotic deposits were scattered throughout the lung as well as on the surface. The bronchial and mediastinal lymph glands, both right and left, exhibited marked melanosis.

Microscopical examination was conducted on sections taken from all the affected tissues. These demonstrated conclusively the presence of a melanotic sarcoma.

No melanotic or sarcomatous condition was found in any other tissues.

CHRONIC TENDINITIS.

From Veterinary Division, Kans. State Agr. College.

A jack weighing about 900 pounds was presented at the veterinary clinic of the Kansas State Agricultural College on the 30th day of April, 1919, with the following history:

CHRONIC TENDINITIS BEFORE OPERATION.

According to the owner the animal appeared lame in the right hind limb about 18 months ago, and 6 months ago the foot knuckled under so the weight was supported on the anterior coronary region. According to the owner the animal also appeared

to have some trouble with the left hind limb, but in his opinion this was not serious and did not require attention.

Symptoms: Temperature, pulse and respirations were normal. The right hind fetlock was extremely flexed so that the solar surface of the foot was turned up and the animal's weight was borne on anterior coronary region. The left hind foot rested upon the anterior margin of the toe. The flexor tendons of both hind limbs were thickened, though not sensitive to pressure.

A diagnosis of chronic tendinitis was made and an unfavorable prognosis given.

Treatment: The animal was placed on the operating table and by following the usual technique, the tendon of the deep flexor of the left limb was divided so that the left hind foot could readily be placed in a normal position. In the case of the right hind limb the deep tendon was also divided, but it was believed, owing to the fact that this limb had been in its abnormal position for such a long time, it would not be possible to straighten the phalangeal region, and therefore the superficial flexor was also divided so that the foot could be placed in a normal position. Immediately after the operation the attention of our students was called to the fact that in our experience cases in which there was extreme flexion did not as a rule do well after an operation because, while the foot would assume a normal position, the phalangeal bones would not always adapt themselves to the new condition and degenerative changes might be expected.

The left hind limb did well and caused no trouble. The right hind limb below the hock became considerably swollen, especially so in the phalangeal region, and about 2 weeks after the operation degenerative changes manifested themselves by intense œdema and the presence of small abscesses. A week later the fetlock region broke down completely so that the animal bore its weight on the posterior surface of the phalangeal region. The general condition of the patient remained good during all this time, but the condition of the limb was considered hopeless and the animal was therefore destroyed.

A medial section of the left hind limb below the tarsal region demonstrates that the space between the divided ends of the deep flexor had filled in properly.

A similar section of the right hind limb also indicated that the space between the divided ends of both the superficial and deep flexors had filled in properly and therefore that portion of

CHRONIC TENDINITIS IMMEDIATELY AFTER OPERATION.

CHRONIC TENDINITIS A FEW WEEKS AFTER OPERATION.

the operation had terminated successfully; however, this section also indicated that the first phalanx had been unable to adapt itself to the changed relations and therefore nature was attempting to form a new joint between the antero-inferior ex-

CHRONIC TENDINITIS. MEDIAL SECTION OF RIGHT HIND LEG.

tremity of the first phalanx and the second phalanx. This had resulted in intense inflammatory and degenerative changes which had manifested themselves outwardly by swelling and abscess formation.

CIRCULATORY FILARIASIS.

From Veterinary Division, Kans. State Agr. College.

A male hunting dog, 4 years old, was presented at the veterinary clinic of the Kansas State Agricultural College on 18th of March, 1919, with the following incomplete history:

About ten days or two weeks previously the owner noticed that the dog was showing enlargement of the abdomen which had been increasing in size daily.

Symptoms:—Temperature 100.6, pulse 110 and very irregular, respirations 18.

Conjunctiva and other visible mucous membranes very anemic. Breathing laborious and abdominal in character.

The abdomen was twice its normal size owing to the presence of what was believed to be ascitic fluid. The hind limbs were edematous.

CIRCULATORY FILARIASIS.

A tentative diagnosis of valvular insufficiency was made, and an unfavorable prognosis given. No treatment was attempted.

The animal was killed on the 19th of March. Dr. L. R. Vawter, instructor in Pathology in the Division of Veterinary Medicine, Kansas State Agricultural College, submits the following postmortem report:

Gross appearance of cadaver revealed marked ascites and edematous swelling of the posterior extremities. The latter condition extending from the gluteal region to the tarsus in each

limb. Upon removal of the skin a very marked dropsical infiltration was evident at the above regions.

The abdominal cavity contained about one and one half gallons of sero-sangineous exudate. The liver exhibited a rough uneven surface and on the interior surface immediately below the portal vein was an area where the capsule had apparently ruptured allowing the escape of blood into the abdominal cavity.

HEART AND LUNGS OF DOG AFFECTED WITH CIRCULATORY FILARIASIS.

Microscopic examination of sections from the liver revealed passive congestion associated with marked fatty infiltration.

HEART

The marked dilatation of the right ventricle was very apparent upon gross examination of the organ.

The heart was opened in a manner so as to expose the auriculo-ventricular valves and the semilunar valves. A tangled mass of Filariæ immites (Dicro filaria) were found extending through the right auriculo-ventricular orifice thus preventing proper closure of the valves. The tangled mass of Filariæ immites extended continuously into the right ventricle and then followed the lumen of the pulmonary artery into right and left lungs. The largest mass of filariæ was evident in the right

lung where the primary branches of the pulmonary artery contained numerous filariæ. The filariæ were absent in the left side of the heart and common aorta.

The ascites was probably due in part to cardiac disturbance caused by the presence of filariæ and the escape of blood due to rupture of hepatic vessels through the capsule of the liver during the period of violent exercise during a hunt.

Morphology and Life cycle of Filaria immitis.

The Filaria immitis is a long slender thread-like white worm ranging in length of 6 to 8 inches in the males, and 8 to 10 inches in females. The larvæ are found in fresh blood preparations and usually about one sixteenth of an inch in length.

LIFE CYCLE

According to Bancroft, Noe, Fullehorn and others the embryos which are already freed in the body of the viviparous female enter the blood stream of the host. The larvæ are taken up from the host blood by sucking insects particularly mosquitos, namely Anopheles maculipennis, Anopheles bifurcatus and Culex fatigans. The larvæ migrate from the digestive tract of the blood sucking insect into the excretory malpighian tubes of the insects where they undergo developement. In 10 to 12 days after they have been taken up by the insect they break through the walls of the malpighian tubes of the mosquito and enter the circulatory system of the suctorial appendage where they again migrate through the walls of the suctorial appendage during the biting period of the insect and gain entrance to the blood stream of the vertebrate host.

The filariæ are sometimes found in the subcutis exclusively, but none were found in this region in this dog. In so far as we could determine the filariæ were absent from kidneys, spleen and liver.

GENERALIZED TUBERCULOSIS OF THE HORSE.

M. F. Barnes, V. M. D.,
From the Division of Laboratories of the Pennsylvania Bureau of Animal Industry.

On April 4, 1919 our laboratory received a specimen consisting of a section of lung and a section of spleen of a horse, with the history that the horse from which the specimens were

taken was a bay gelding, about 8 years old, weighing about 950 pounds and had been a healthy individual since about five years ago when he had distemper, until just about eight weeks prior to April 4th when he developed a dry cough, became sluggish, easily exhausted and sweat very easily. Some time later his appetite became decreased, the cough became more pronounced,

No. 1. SECTION OF SPLEEN OF HORSE SHOWING TUBERCULOUS LESIONS.

the temperature becoming somewhat elevated. About ten days prior to death he showed symptoms of pleurisy and hydrothorax, also edematous swelling of the infrasternal region and an elevation of temperature to 105 degrees Fahrenheit. These symptoms disappeared about three to four days previous to death. During the later stages of the disease the animal rapidly became emaciated and the appetite became very much decreased.

The owner of this horse at the time of its death, had owned

him for three years and had kept him in a basement barn where at least one other horse and some cows were kept, all of which have apparently been in good physical condition although a tuberculin test has never been made.

No. 2. SECTION OF LUNG OF HORSE SHOWING TUBERCULOUS LESIONS.

The report of autopsy upon this animal shows that there was a fibrinous pleurisy; lymph glands were hemorrhagically swollen; otherwise the spleen and the lungs were the only organs affected, the latter showing evenly distributed lesions throughout their substance.

Upon examination of the section of lung and spleen received at the laboratory, the former presented cheesy necrotic areas throughout its substance varying in size up to about one half inch in diameter and many of these confluent. The spleen showed numerous circular abscesses throughout the section and measuring from miliary size up to one half inch in diameter.

Smears and sections of the affected lung and spleen revealed numerous acid fast bacilli characteristic of the bacillus of tuberculosis.

The following laboratory animals were inoculated with a saline emulsion of pus from these specimens:—

No. 449. Rabbit. Inoculated subcutaneously April 4, 1919. Died June 3, 1919. Generalized tuberculosis.

No. 450. Rabbit. Inoculated subcutaneously April 4, 1919. Died July 5, 1919. Generalized tuberculosis.

No. 451. Guinea pig. Inoculated intraperitoneally April 4, 1919. Died April 20, 1919. Generalized tuberculosis.

No. 452. Guinea pig. Inoculated subcutaneously April 4, 1919. Died May 23, 1919. Generalized tuberculosis.

From the above experiment it appears that the strain of tubercle bacillus under study was of the bovine type.

The source of the infection of this horse is not known but inasmuch as this animal was stabled in a basement barn with cattle it is quite probable that there has been a bovine spreader of the disease in the stable at some time leaving the stable or feed contaminated with tubercle bacilli of the bovine type.

Several cases of tuberculosis of the horse have been reported although when the situation is summed up the disease is comparatively rare in the equine family and especially is this true of generalized tuberculosis. Most cases that have been reported have shown more or less localized lesions.

Such a case as this must certainly have an important bearing upon attempts to eradicate tuberculosis of cattle. This animal having had open tuberculosis of the lungs must have been the spreader of millions of tubercle bacilli. It seems then that one who is attempting to rid a herd of cattle of tuberculosis in a barn where other species of animals are also kept, at least from an economic standpoint, should look to, and make an inspection of other animals.

HEMORRHAGIC SEPTICEMIA IN HOGS.*

G. A. JOHNSON, Sioux City, Iowa.

This herd consisted of approximately eighty-eight shoats and seven two-year-old sows. The sows had been immunized against the filterable virus as pigs in 1917, but the shoats had not been immunized.

So far as the owner could determine the pigs appeared all right until the evening of December 6, 1918, when five or six

* Presented at recent meeting of the Iowa Veterinary Association, Ames, Iowa.

did not come out to feed and on the morning of the 7th, about fifteen were off feed.

I first saw the herd late in the afternoon of this date, when we found about thirty off feed, and presenting the following symptoms: loss of appetite, slightly gaunted, dry hacking cough on being driven out of their bed, a marked distressed appearance manifested by the ears drooping, back arched, hair standing, and disinclination to move.

Quite a number were thumping, some badly, others only slightly, bowels appeared normal, eyes had a drowsy appearance but no discharge, temperatures running from around 104° to 106°, mostly 104° to 105°F.

Some of those that were eating presented as high temperatures as those that were sick.

Post mortem of pig No. 1, showing thumps, temperature 105°, ears drooping, back arched, hair standing, slight cough on being made to move, bowel excretions normal.

Lesions: cervical lymph glands slightly enlarged and hyperemic at the periphery, lungs presented small, moist, pinkish-gray consolidated areas in the anterior lobes, with a few filariæ in the posterior, inferior portion of the caudal lobe. Bronchial lymph glands considerably enlarged and of a bright pink color at the periphery. Heart presented a par-boiled appearance. Abdominal viscera appearantly normal.

On the forenoon of December 8 about seventy-five head, including one of the old sows, were off their feed, and presenting about the same symptoms as were observed the evening before. This was about double the number off feed about sixteen hours earlier. Most of those sick the evening before appeared about the same, though some appeared worse, especially as to the thumping. Temperatures were a little higher, a few up to 106° and one 107°F.

Post mortem of pig No. 2, presented lesions very similar to those of pig No. 1, except that the lesions in the lungs were a little more extensive, and the heart presented an extensive, acute, vegetative pericarditis and myocarditis. The lungs and heart were taken to the laboratory for microscopical examination which revealed an abundance of bipolar staining micro-organisms, *B. suisepticus*.

One pig that presented a temperature of 104.5°F. and quite severe thumps, with irregular and labored heart action, was ta-

ken to Doctor Statter's hospital and given a large dose of anti-hog cholera serum and a dose of mixed bacterins. It made an uneventful recovery.

The remainder of the herd did not receive any treatment and there was a loss of only five head at last report, January 4, 1919.

At the time of my visits I was pretty certain that it was an outbreak of swine plague, which was confirmed by the laboratory work so far as it went. But the apparent severity of the outbreak and the rapidity with which it spread through the herd led me to suspect the presence of the filterable virus, although none of the lesions ordinarily attributed to this were present. This view was somewhat strengthened by the fact that a pig from this drove had been posted by the veterinarian in charge of production at one of the serum plants, with the diagnosis of suspicion of cholera. This was on the date of my first visit.

Judging from the conditions as they appeared to me at that time I did not think that enough animals could be saved to pay for the serum treatment, consequently no treatment was given.

In the after light of this case it is plain that I made at least two mistakes:

First, that the filterable virus was not present, or if it was we must change our ideas relative to its pathogenicity.

Second, that despite appearances the disease was not of a fatal type.

Again, if treatment had been given and the results had been as satisfactory as they were without, it would have led to the false belief that the treatment had checked the disease and saved the animals.

TETANUS IN PIGS.

H. N. Waite, Corsica, S. D.

A farmer near here had over a hundred shoats about three months old. Among them were fifty-seven males which he had castrated just a week before. I was called out to see them. The owner told me that his pigs were sick with a funny sickness; said they got stiff and he thought it was lock-jaw. Five had died and two were showing the symptoms of tetanus. We talked it over and I advised him if any more showed symptoms to let me know and we would give them antitoxin. I didn't see or

hear from him again until July 4th, when the owner told me that thirteen had died and some were showing symptoms every day. We immunized thirty-six of the thirty-seven with 300 units each of antitoxin. Five of the thirty-seven cases could not walk. One we considered a hopeless case and didn't expect any of the five to pull through. Every one up to this time that had shown the symptoms had died. After treating them there was not another case developed and three of the four showing the symptoms recovered. They were treated about two weeks after they were castrated. I had never heard of a case of that kind and never heard of giving treatment to pigs and didn't know how much to give, so it was just an experiment but the results were satisfactory.

The following list of graduates of the class of "19" New York University, received their diplomas and prizes on Commencement Day:

Abramson, Alexander Henry; Benson, Clarence Oakley; Carabba, Victor (Prizes: Faculty Gold Metal, Canine Surgery and Therapeutics); Felder, Morris; Koslow, Harry Louis; Kreindler, David Arnold (Prize: W. W. Yard, 1st Practical Prize); Lebish, Jacob (Prize: Alumni Prize); Speveck, Victor (Prize: W. W. Yard, 2nd Practical Prize); Wright, James Mathews.

The West Virginia State Veterinary Examining Board held its regular examination at the Kanawha Hotel, Charleston, on June 1st, and the following applicants passed: Dr. Taylor, Richie County, W. Va., and Dr. D. C. Mollody, of Oakland, Md.

The new board consists of

Dr. E. M. Spangler, President.
Dr. J. C. Callender, Vice-President.
Dr. W. E. Langford, Secretary.

The Lederle Laboratories at Pearl River, N. Y., have among their group of Veterinarians representatives of several of our veterinary schools. At the head Prof. Adolph Eichhorn of the New York American Veterinary College, Dr. Chas. H. Higgins of the Montreal Veterinary College, Dr. Sven Isaacson Ryan and Dr. John P. O'Leary of the Veterinary Department of the University of Pennsylvania, and Dr. J. F. Schubert of New York State Veterinary College at New York University.

ABSTRACTS.

MOST STRENUOUS LABOR, A CONDITION PRELIMINARY TO IMPORTATION OF MEAT AND OTHER FOODS FROM ABROAD.[1]

By R. v. OSTERTAG.

Zeitschrift fur Fleisch-und Milchhygiene; Vol. 29, February, 1919; pp. 113-115.

As the terrible war ended and the democratic form of government was instituted, the German people believed, that now their unexampled suffering and hunger lasting years, to which may be attributed the many deplorable effects on their mental and physical beings, will have an end. The German people have read in the enemy press that they have nothing against the German people, and from that concluded that after cessation of hostilities, the shackles on our income of food would be loosened, and it would be possible to obtain from the excess supplies overseas, if only in small lots at first, in order to better our starvation diet. This hope has not been realized! On the contrary, the blockade has been tightened, and more than two months have elapsed since the conclusion of the armistice, without a single overseas importation having been possible. But now it is at least clear, from recent conferences with American and Entente representatives at Treves, what we may expect from America and under what conditions. And these terms are a terrible warning to the German people. Their disregard leads Germany irretrievably into famine!

The Under-secretary of State in the Imperial Nutrition Office, Excellency v. Braun, who presided at the German Commission on Nutrition at the armistice, stated to a newspaper reporter that the Entente had agreed to an emergency allowance for the period of the armistice, of food equivalent to 30 million dollars to be fed to invalids, children, expectant and nursing mothers, and certain workers. It was stipulated that our entire merchant fleet, in seaworthy condition, be placed at the disposal of the Entente. If the repair and equipment of the boats are carried out immediately and their departure from German ports in no wise delayed, the emergency deliveries may be expected

[1] Translated by William N. Berg, Washington, D. C.

in 2 to 3 weeks. The amount of food that may be obtained for 30 million dollars at present world-market prices, is not very large. From statements obtained from the German Commission on Nutrition, the following kinds and quantities of foods may be considered: 70,000 t pork products, mainly bacon and lard and other fats; 50,000 t wheat and smaller amounts of condensed milk, oatmeal, rice, and meat extract. It is to be noted that these quantities will suffice only for invalids and other needy individuals and not for the general improvement of nutrition. With regard to the further supply for Germany, the representatives of the Entente and America have stated, that the world's supplies of fats and cereals are ample for the entire world's needs. The revictualing of Germany is dependant only upon our compliance with the terms. *The prevention of the threatening famine lies in our hands. Labor is necessary for the prevention of this famine, unremitting and most strenuous labor in order to provide material as rapidly as possible for foreign payment of the promised food supplies.* The important materials are coal, potash salts and manufactured articles. What has happened to the output of these commodities? Strikes and senseless wage demands have so diminished the coal output that during the entire war, in spite of the tremendous consumption of coal by the munition plants, we were never so poorly provided as now. Therefore, at the present time coal cannot be exported, and all industrial establishments suffer from its scarcity, among them, the potash industry which furnishes one of our most valuable commodities in exchange for food. Every additional day of insufficient coal production increases the danger of famine. On these matters the German people do not seem to see clearly. Otherwise it would be difficult to understand why the people, in these most trying times through which Germany has ever passed, instead of uniting for earnest productive work, give themselves over to strikes and phantastic wage demands which continually depress the foreign purchasing power of our money and render our manufactured goods unsaleable because too expensive. It is therefore the sacred duty of every one, by word and deed, through example and instruction to explain to the worker, his wife and children, that disaster will overtake us if we do not work perseveringly to earn the food from abroad and that we will not become richer but poorer if all demand multiples of present day wages. This results in our

paying so much more for our necessities and we will not be able to purchase anything abroad because of the high price of our commodities coupled with the depreciation of our money.

Russia is a warning. One should read the short account by Jenny (in the Mitteilungen der Deutschen Landwirtschafts-Gesellschaft 1919 Stück 4) of the Russian agriculture under the present regime and perceive in his dispassionate descriptions. the conclusive tragedy of the devastation of city and country in the formerly great Russian Empire, which had the advantage over Germany of having an excess of land productive of foods and feeds, and capable of existing without imports. One reads how phantastic wages, driven past all possible agricultural limits, have separated capital and labor, damming both to sterility. How "stupid equality" destroyed agricultural productiveness. How violent, work-detesting elements through the formation of local Soviets have become tyrants and terrorize the active country people. How one hears in the country the same "terrible groans and sighs" and the same "death-rattles of tortured men" as in the cities. How starving city people go out into the country to take food by force; how tumultuous mobs of peasants from regions of crop failure travel to better land to plunder it and as a result of such occurrences, the curse of complete lawlessness and the war of all against all reigns in the giant Empire.

Labor and more labor, rigorous state regulation, and the postponement of hazardous agricultural experiments to more favorable times, must and shall preserve the German people from such a fate.

"THE ETIOLOGY AND TREATMENT OF GRANULAR DERMATITIS."

"The etiology and treatment of granular dermatitis, R. Van Saceghem (Bul. Soc. Path. Exot., 11 (1918), No. 7, pp. 575-578; abs. in Trop. Vet. Bul., 6 (1918), No. 3, pp. 171-173).—Further experiments confirm the author's view that flies are the vectors of Habronema larvæ, the cause of summer sores, as previously expressed, and proved that the parasites found in the verminous nodules is an aberrant larva of *H. muscæ.* This substantiates the view of Railliet and Henry.

"Horses affected with granular dermatitis often showed conjunctivitis, and this was found to be set up by the presence of small verminous nodules located especially on the membrana nictitans."

A curative treatment regarded by the author as specific consists in the careful disinfection of the sore and then the application of a powder consisting of plaster of Paris 100, alum 20, naphthalin 10, and quinin 10 parts, or a sufficient quantity of any other bitter powder. This powder protects the sore against flies, is very adhesive, rapidly dries up the sore, and the bitter ingredient prevents the animal from biting itself. It prevents further infection with larvæ, and those already present become encysted and are eliminated without causing any damage. All the sores treated in this way become rapidly cicatrized. Care should be taken to renew the plaster as long as the slightest breach in continuity of the surface remains.

—*Experiment Station Record.*

FIELD DAY AND MEETING IN MASSACHUSETTS.

The Massachusetts Veterinary Medical Association will hold a Field Day and Meeting in Springfield Wednesday, September 17th, and possibly including the 18th.

The meeting will be at the Eastern States Exposition Grounds where a room has been reserved for headquarters, and the reading of such papers as may be presented. However, the meeting is being held at this time to enable the members to take advantage of the Exposition, which has the unique record of having staged the most successful meeting of the National Dairy Show in its twenty, or more, years of existence. All the "boys" in the East are cordially invited to this meeting, where there will be some one to receive them and direct them to the different places of interest.

Dr. W. O. McHugh has been recently transferred from Cleveland, Ohio, to Huntington, W. Va., where he is in charge of meat inspection.

Capt. E. F. Pile, who has been serving with the A. E. F. for the past year, expects to return shortly and upon his return will again locate at Liberal, Kansas.

ARMY VETERINARY SERVICE

FROM THE OFFICE OF THE SURGEON-GENERAL OF THE ARMY, WASHINGTON, D. C.

OFFICERS, VETERINARY CORPS, UNITED STATES ARMY.

	On Duty. July 11, 1919.	On Duty. Aug. 11, 1919.
Colonels	0	0
Lieutenant Colonels	6	5
Majors	68	54
Captains	182	119
First Lieutenants	382	255
Second Lieutenants	357	178
Totals	995	611

The following orders of transfer or reassignment have been issued for veterinary officers during the past month:

1. Lieut. Colonel Robert Vans Agnew, V. C., who has just returned from service overseas, is directed to report for duty as Post Veterinarian, Fort D. A. Russell, Wyoming.

2. Lieut. Colonel Richard H. Powers, V. C., who has just returned from service overseas, is directed to report for duty as the Veterinarian, Auxiliary Remount Depot, Camp Pike, Arkansas.

1. Major B. A. Seeley, V. C., who has just returned from duty overseas, is directed to report for duty as the Veterinarian, Auxiliary Remount Depot, Camp Upton, N. Y.

2. Major W. J. Ratigan, V. C., who has just returned from service overseas, is directed to report to West Point, Ky., for duty as Camp Veterinarian, Camp Knox, Ky.

3. Major Charles H. Jewell, V. C., from duty at Camp Dix, N. J., to Washington, D. C., for duty in the Office of the Surgeon General, Veterinary Division.

4. Major Burt English, V. C., who has just returned from overseas where he served as the Corps Veterinarian, 5th Army Corps, is directed to proceed to Auxiliary Remount Depot, Camp Lee, Va., for duty as the Veterinarian.

5. Major William C. Van Allstyne, V. C., from duty as the Veterinarian, 6th Cavalry, to Fort Oglethorpe, Ga., for duty as the Veterinarian.

6. Major Thomas H. Edwards, V. C., from duty at Camp Sheridan, Ill., to Auxiliary Remount Depot, Camp Jackson, S. C., for duty.

7. Major Henry W. Peter, V. C., who has just returned from duty overseas, is directed to report for duty as the Veterinarian, Fort Bliss, Texas.

8. Major A. Mitchell, V. C., who has just returned from duty overseas, is directed to report for duty as the Veterinarian, Auxiliary Remount Depot, Camp Funston, Kan.

9. Major Joseph N. Hornbaker, V. C., is relieved from duty in the Office of the Surgeon General, Washington, D. C., and directed to proceed to the Philippine Islands on the transport sailing about September 5, 1919, for duty as Assistant to the Department Surgeon, Philippine Department.

TREATING ARMY HORSES FOR MANGE OVERSEAS.

A TYPICAL CASE OF MANGE.
Showing the system of marking horses, May 26, 1919.

10. Major Walter Fraser, V. C., who has just returned from service overseas, is directed to report to Fort Sill, Okla., for duty as the Post Veterinarian.

11. Major J. H. Uri, V. C., who has just returned from duty overseas, is directed to report for duty as Camp Veterinarian, Camp Gordon, Ga.

12. Major G. H. Koon, V. C., who has returned from duty overseas, is directed to report for duty as Camp Veterinarian, Camp Dodge, Iowa.

13. Major J. J. Connolly, V. C., from duty as Division Veterinarian, 6th Division, is directed to report to the Zone Supply Officer, Chicago, Ill., for instruction in meat inspection.

THE DIPPING VAT.
Showing the shed which houses this steam-heating plant for keeping the solution in the vat warm.
3d Army Veterinary Evacuation Section No. 3, Coblenz, Germany, June 1, 1919.

14. Major A. E. Donovan, V. C., is directed to report for duty as Division Veterinarian, 6th Division, Camp Grant, Ill., in addition to his other duties.

1. Captain D. S. Robertson, V. C., from Camp Lee, Va., to Zone Suply Officer, Chicago, Ill., for a course of instruction in meat inspection.

2. Captain Edward M. Curley, V. C., from duty in the Office of the Surgeon General, Washington, D. C., to Fort Leavenworth, Kansas, for duty as the Veterinarian, U. S. Disciplinary Barracks, that post.

3. Captain Edward P. O'Connell, V. C., from duty in the Office of the Surgeon General, Washington, D. C., to Auxiliary

DOWN THE SLIDE TO A LIME AND SULPHUR BATH.
3rd Army Veterinary Evacuation Section No. 3, Coblenz, Germany, June 1, 1919.

Remount Depot, Camp Devens, Mass., for duty as the Veterinarian.

4. Captain Robert P. McComb, V. C., from duty Camp Devens, Mass., to Zone Supply Officer, Chicago, Ill., for a course of instruction in meat inspection.

5. Captain J. R. Underwood, V. C., from Camp Dix, N. J., to Fort Riley, Kan., for duty at the Mounted Service School as Instructor.

6. Captain C. C. Bourland, V. C., from Fort Des Moines, Iowa, to Camp Fort Bliss, Texas, for duty as Veterinarian with 82nd Field Artillery.

7. Captain P. R. King, V. C., from Fort Bliss, Texas, to Canal Zone, Panama Canal Department, for duty.

THE PLUNGE.
3d, Army Veterinary Evacuation Section 3, Coblenz, Germany, June 1, 1919.

8. Captain H. E. Homer, V. C., from Hoboken, N. J., to Camp Bragg, N. C., for duty as Camp Veterinarian.

9. Captain A. C. Wight, V. C., from Camp Dix, N. J., to Camp Humphreys, Va., for duty.

10. Captain George W. Brower, V. C., relieved from duty in the Philippine Department on the arrival of Major Hornbaker, and will proceed to the U. S. on the first available transport.

11. Captain H. R. Holmes, V. C., from A. R. D., Camp Upton, N. Y., to Commanding Officer, Fort Jay, Governors Island, N. Y., for duty as Post Veterinarian.

1. 1st Lieut. C. F. Morris, V. C., from duty at Camp Funston, Kan., to Commanding Officer, that Camp, for duty as assistant to Camp Veterinarian.

JUST COME UP FOR THE SWIM OUT.
3d Army Veterinary Evacuation Section No. 3, Coblenz, Germany.
June 1, 1919.

2. 1st Lieut. L. V. Murrian, V. C., from Camp Dix, N. J., to A. R. D., Camp Travis, Tex., for duty.

3. 1st Lieut. J. R. Shand, V. C., from San Francisco, Calif., to Camp Dix, N. J., for duty as assistant to Camp Veterinarian.

4. 1st Lieut. D. H. Mallan, V. C., from duty at Camp Grant, Ill., to Zone Supply Officer, Chicago, Ill., for instruction in meat inspection.

5. 1st Lieut. W. O. Hughes, V. C., from Camp Dix, N. J., to A. R. D., Camp Gordon, Ga., for duty.

6. 1st Lieut. S. D. Stroly, V. C., from Camp Upton, N. Y., to Zone Supply Officer, Chicago, Ill., for instruction in meat inspection.

7. 1st Lieut. O. E. Markley, V. C., from Camp Dix, N. J., to A. R. D., Camp Gordon, Ga., for duty.

8. 1st Lieut. J. N. Dornblaser, V. C., from Camp Dix, N. J., to Fort Riley, Kan., for duty as instructor in the Mounted Service School.

9. 1st Lieut. N. L. Cline, V. C., from duty with Zone Supply Officer, Chicago, Ill., to Fort Sill, Okla., for duty as assistant to Post Veterinarian.

10. 1st Lieut. F. E. Metcalf, V. C., from Camp Taylor, Ky., to A. R. D., Fort Bliss, Tex., for duty.

11. 1st Lieut. R. I. Lovell, V. C., from Camp Dix, N. J., to Marfa, Tex., for duty with 8th Cavalry.

12. 1st Lieut. G. Castleberry, V. C., from duty with 82nd F. A., Fort Bliss, Tex., to Fort Ringgold, Tex., for duty with 4th Cavalry.

13. 1st Lieut. J. A. McCallan, V. C., from duty with 4th Cavalry, Fort Ringgold, Tex., to Zone Supply Officer, Chicago, Ill., for instruction in meat inspection.

14. 1st Lieut. R. M. Sarde, V. C., from Camp Dix, N. J., to Remount Depot, Front Royal, Va., for duty.

1. 2nd Lieut. R. E. Smith, V. C., from Camp Upton, N. Y., to A. R. D., Camp Custer, Mich., for duty.

2. 2nd Lieut. H. J. Boyce, V. C., from Camp Dix, N. J., to Commanding Officer, the Camp, for duty as assistant to Camp Veterinarian.

3. 2nd Lieut. S. G. Kielsmeier, V. C., from Camp Mills, N. Y., to Fort Bliss, Tex., for duty with 5th Cavalry.

The following officers have resigned from the Veterinary Corps during the past month:

Captain J. N. Graves, 2nd Lieut., Regular Army.
1st Lieut. W. A. Aitken, 2nd Lieut., Regular Army.
1st Lieut. C. E. Fanslau, 2nd Lieut., Regular Army.
1st Lieut. A. G. Gierke, 2nd Lieut., Regular Army.
1st Lieut. J. W. Hastings, 2nd Lieut., Regular Army.
Captain N. M. Neate, 2nd Lieut., Regular Army.

LIEUT. COLONEL L. A. MERILLAT, U. S. A.

Lieut. Colonel Merillat was commissioned direct from civil life as a Major, National Army, October 5, 1917, and assigned to duty as Division Veterinarian, 41st Division with station at Camp Greene, N. C. He reported for active service October 16, 1917, at that camp. Transferred from Camp Greene to Camp Mills, N. Y., on October 24th and was stationed there until December 11, 1917. Left United States on that date, arriving in France December 29, 1917. Proceeded to Camp La Courtine, France, where he was stationed until January 6, 1918.

Acted as Chief Veterinarian, Advance Veterinary Hospital, Neuchateau (Vosges) from January 10th to April 28th. This was the first A. E. F. Veterinary Hospital and was organized, equipped and enlarged from the capacity of 700 to 1200 animals. The first sulphuration plant of A. E. F. was built and operated at this hospital. A research laboratory was installed and operated with this hospital by Lieut. Strausse, M. C., and Lieut. Wight, V. C.

On April 24th, Col. Merillat was relieved from duty at this hospital and appointed executive officer for the Franco-American Veterinary Liaison Mission, Paris, in which capacity he served until August 1, 1918. The mission submitted circulars to the American army on the management of animals and the handling of the principal animal scourges, inspected remounts, veterinary hospitals and organizations of the line and made recommendations on the sanitary problems involved in the requisitioning of approximately 75,000 horses from French civilians.

He was appointed Chief Veterinarian, 1st Army, A. E. F., on August 1, 1918, and served in this capacity until February 23, 1919. With the first army, he served through the last phases of the Aisne-Marne operation and through the battles of St. Mihiel and Meuse-Argonne. The average number of animals in the First Army during the St. Mihiel and Meuse-Argonne

operations was about 93,000 head. The Veterinary Corps of the First Army during these operations evacuated under the directions of Col. Merillat approximately 23,000 disabled animals. Assisted the veterinary service of the Third Army in the march to the Rhine going as far as the city of Luxemburg where the work was taken over by Lieut. Colonel Bemis who was appointed Chief Veterinarian, Third Army. Moved from the battlefields to the training areas with headquarters at Bar-Sur-Aub, December 5, 1918.

From February 23 to June 1, 1919, he attended the Ecole Veterinaire Nationale d'Alfort for the purpose of writing a report on the education of military veterinarians in France. June 1st to July 11, 1919, enroute to the United States, arriving in New York on the latter date. July 12 to 23rd, on leave of absence from Camp Dix, N. J.

Col. Merillat reported for temporary duty Office of the Surgeon General Veterinary Division, on July 23, 1919, and received his honorable discharge at Washington on the 25th.

The veterinary profession is justly proud of the services that Col. Merillat has performed in the Veterinary Corps during the war. Starting with an assignment as Division Veterinarian, Col. Merillat was exceedingly fortunate to have seen active service with combat troops and also with the service of supply when he was in charge of the Veterinary Hospital. It is only fitting that Col. Merillat's active army service should be crowned with one of the highest decorations that the French Government bestows upon foreign officers. While on duty in Washington, he was notified that he had been decorated with the Legion of Honor by the French Government.

MAJOR CHARLES H. JEWELL, V. C., U. S. A.

Major Jewell was assigned as Division Veterinarian, 80th Division, Camp Lee, Va., and reported for duty January 11, 1918. Left United States with this division on May 22, and arrived at Brest, France, May 30, 1918. The division was immediately assigned to the north of France and brigaded with the British army. Relieved from duty with the 80th Division July 26th and ordered to join the First Army then operating in the Chateau-Thierry district. This was the first time that a corps veterinarian had ever functioned with an American army corps. The work of organizing the corps veterinary service at this time was extremely difficult owing to the lack of lines of communica-

tion with regard to handling of the evacuation of sick animals. It was necesary to organize the evacuation system for sick animals at this time. On August 12th, he was relieved as Corps Veterinarian, First Corps, and assigned Third Corps Veterinarian, remaining in the same sector while the First Corps moved to a new area. Relieved from duty 3rd Corps October 7, 1918, and assigned to the 2nd Army as Army Veterinarian with headquarters at Toul, France. Organized the veterinary service 2nd Army until shortly after the Armistice when he was relieved and assigned to the 9th Army Corps with station at St. Mihiel, France. Remained with the 9th Army Corps until it returned to the United States. Arrived in New York City with the 9th Army Corps Headquarters on June 6, 1919, and assigned to Office of Surgeon General, Washington, D. C., for duty.

MAJOR GEORGE H. KOON, V. C., U. S. A.

On October 27, 1917, Major Koon was assigned as Division Veterinarian 82nd Division, Camp Gordon, Ga. Promoted to the grade of Captain, October 9, 1917. Transferred as Division Veterinarian, 32nd Division, on January 16, 1918. Sailed with that division from the United States for overseas service on January 31, 1918, arrived Liverpool, England, February 16, 1918, and sailed from Southampton, England, for La Havre, France, on February 26th.

The 32nd Division arrived in the 10th Training Area with headquarters at Prauthoy (Haute-Marne) March 1, 1918. It was the 6th division to join the A. E. F. On March 8th, Captain Koon was ordered to the ''Service of the Rear'' for temporary duty of purchasing animals from the French and was on this duty until April 29, 1918, when he returned to the 32nd Division. On May 15, 1918, the 32nd Division moved to the Alsace sector, remaining there until July 15, 1918, when it was moved by train to the Compiegne sector. Two days after the concentration of the division in the Compiegne sector it marched to the Marne, arriving at Chateau Thierry July 27, 1918, and on July 29th this Division relieved the 3rd Division on the Ourcq in the Aisne-Marne Offensive. August 28, 1918, the 32nd Division again entered the front line northeast of Soissons as a part of the French 10th Army. It was the only American unit operating with that Army and assisted in capturing strong German positions on the Juvigny plateau. The Division contributed to an important extent in the success of the French in

outflanking the German line on Chemin des Dames. Captain Koon served as Division Veterinarian 32nd Division throughout this offensive and on September 3rd, 1918, was relieved and promoted to act as Corps Veterinarian, 6th Army Corps. On September 13th, ordered to the 90th Division as Division Veterinarian in the St. Mihiel drive. Promoted to grade Major, U. S. A., September 27, 1918, and continued to act as Division Veterinarian with the 90th Division during the Meuse-Argonne Offensive. Relieved from duty with the 90th Division on December 5, 1918, ordered to 3rd Army Corps as Corps Veterinarian and served with this Corps on the march to the Rhine. The 3rd Corps was the most advanced American Corps in Germany and the only one to cross the Rhine, holding the most advanced territory with the 1st, 2nd and 32nd Divisions.

Relieved from duty with the Army of Occupation on July 9, 1919, and sailed from Brest, France, on July 16, 1919, with the 3rd Army Corps headquarters. Arrived in New York July 27, 1919, where the headquarters were disbanded after which Major Koon reported to the Surgeon General for assignment.

Major Koon is the proud possessor of five battle stars, he having actively participated in 4 offensives and 1 defensive. This is an unusual record even for line officers.

Major Koon has been assigned as Camp Veterinarian, Camp Dodge, Iowa.

ELECTION TO DECIDE TUBERCULOSIS POLICY.

The first election in the United States to decide whether or not a county should eradicate tuberculosis from its herds of cattle has been ordered to be held in Clay County, Mississippi, September 2. The election was ordered by the county board of supervisors after a petition asking for it had been presented by a group of citizens. The results of this election will have much more than local interest, because the election may be the forerunner of hundreds or thousands of others in other sections of the country, according to the Department of Agriculture.—*Breeders Gazette,* July 31, 1919.

Two State Scholorships for New Jersey were announced on Alumni Day at the New York State Veterinary College, New York City.

ASSOCIATION NEWS.

AMERICAN VETERINARY MEDICAL ASSOCIATION.

President Moore has appointed Dr. Fred. Torrance, Ottawa, Canada, a member of the International Committee on Bovine Tuberculosis, to succeed Dr. J. G. Rutherford, who has resigned on account of pressure of other duties.

SECRETARY'S OFFICE.

The past few weeks have been rather quiet ones so far as the work of the Secretary's office is concerned, but not so for the Secretary, who has been undergoing a rather strenuous time in a hospital. However, the worst seems to be over. Next month statements for dues for the coming year will be sent out together with a letter to all members.

The program of the New Orleans meeting is well under way and promises to be an unusually good one. Several papers on the Army Veterinary Service are promised and a number of papers on practical subjects that will be of interest to every practicing veterinarian. Some scientific papers are also provided for on transmissible diseases that will give the very latest definite data on diseases that every veterinarian should have.

Owing to illness, the Secretary has only been able to attend the meetings of the Illinois Veterinary Medical Association, a report of which is published in this issue of the Journal, and the Missouri Valley Veterinary Association meeting at Omaha. At both meetings the advantages of the A. V. M. A. were presented and a number of new applications were received. At the present time there are about five hundred applications for membership in the Secretary's hands. Every member of the Association should make an effort to get at least one new member. This can be done if each individual will make an effort, and it would mean a tremendous advance in the progress of the Association, and of the profession generally.

It is reported that good progress is being made for the permanent veterinary organization of the Army and also on the bill for increasing the pay of the veterinarians in the service of the

Bureau of Animal Industry. There are a number of problems of a business nature to come before the Association at the next meeting and every member should make plans now to attend the meeting and bring his wife or sweetheart. There will be "something doing" all the time.

N. S. MAYO.

LOOKING SOUTHWARD.

For the past twenty-six years the American Veterinary Medical Association has had its regular annual meeting either in August or September. In 1893 it convened in Chicago, October 17-20th, just twenty-six years and one month to a day from the time it will meet in New Orleans November 17-21st. When the members have been trained for a quarter of a century to look forward to the meeting in August or September, the period seems unusually long when it is deferred until November.

In 1914 we began to have visions of New Orleans, but our hopes were suddenly shattered with an outbreak of foot and mouth disease which retained the profession at home, and it was looked upon as a duty, during perilous times when the patience of all men was severely tried. Many regretted they could not visit the south at that time, but were unanimous in their opinion that the right policy was followed.

Entrance to State University, Baton Rouge, La.

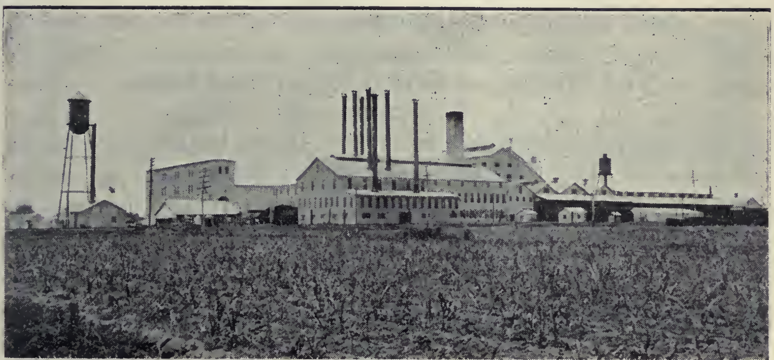
This year we are again looking southward, and by the time you become the reader of this page, only a few more than sixty days will be between you and November 17th. Much could happen in that time to destroy our ambitions to attend, but we are not anticipating such a calamity. We are optimistic, and sincerely believe this will be a striking event in the history of our Association. It should be a record breaker in attendance, definite scientific information derived, recreation, social relationship, and a better understanding of the responsibilities resting upon the veterinary medical profession. Briefly, the future of the profession largely depends upon close observation and upon the character of the membership. We must stand enthusiastically united for a common cause, and the younger generation of veterinarians must keep vividly in mind the splendid lessons taught them by their seniors, so that the spirit may be perpetuated.

Undoubtedly, many new members will be present, and for the first time, will be participants in a great scientific organization. Their first impressions will be lasting ones, and, to a certain extent, a standard for future meetings will be established. We do not want a limit placed on ambition and talent, and in order to avoid this possible handicap, let each older member encourage everyone to take a part. We sincerely hope the spirit of enthusiasm and freedom will be injected into all. Joy should travel with us from our homes to New Orleans and return without a single interruption. The journey southward should be one of anticipation and the homeward one of complete satisfaction. The local committee is doing everything possible toward paving the way for success. Little details are being looked after, and as time is our greatest asset, we are taking it by the forelock and arranging things well in advance.

The convention this fall should be a turning point toward a greater Association, as the membership is rapidly increasing and our duties expanding. A number of vital subjects should be cautiously and logically discussed, and a member who listens carefully, and finally expresses his ideas outside, has, perhaps, withheld a valuable suggestion. "Timidity is responsible for the loss of a great deal of talent". Let us keep in mind the time, place, and opportunity to advance ideas, in a constructive spirit, is in official session, so all can appreciate the status quo.

Only once a year do we have the privilege of renewing old acquaintanceships, making new friends with new members, and

with those who attend, now and then. Some who were present a year ago have crossed the Great Divide, and who knows how many will be permitted to attend another meeting? It is a great reunion and should, in a measure, celebrate the reunion of nations which is a crisis in the course of human events. Names and places have been immortalized, and now it remains with us to make our hopes materialize, and our ambitions to reach the peak of success.



RESERVE SUGAR REFINERY, LOUISIANA.
Showing young growing sugar cane in foreground.

As we turn our eyes toward the land of the golden sunset, we have before us a panorama of views which can only be comprehended through personal observation. Many will journey through the industrial fields of the nation over and between the majestic mountain ranges, and finally across the plantations white with cotton, and sweet with sugar cane, toward sea-level where the proud, stately oaks stand so silent, delicately draped with long tresses of gray Spanish moss. They will be approaching New Orleans, the Crescent City, with its warm gentle atmosphere in direct contrast to the great blanket and drifts of white snow.

When you emerge from the depot and journey up Canal street, you will see great banners fluttering on the broadsides of the Grunewald Hotel, "Headquarters American Veterinary Medical Association, November 17-21st". The imagination of this picture should be an inspiration to all and enthuse us to such an extent that there will remain only one thing to do, and that is to commence right now to be ready in November for a trip southward. E. I. S.

OTHER ASSOCIATIONS.

ASSOCIATION OF STATE AND PROVINCIAL VETERINARY COLLEGES.

REPORT ON THE SUBJECT OF TRANSMISSIBLE DISEASES IN THE VETERINARY CURRICULUM.

By L. VAN ES, Agricultural College, North Dakota.

By degrees a change has taken place in the reason for existence of a considerable part of the veterinary profession. Influences which require no special mention are driving the veterinarian more and more into the open country, where a greater variety of problems are requiring of him more skill and a more thorough training than was needed in the days when ''horse-doctoring'' was his almost sole occupation. The country's increasing population, its crowding into large cities and industrial centers has brought changes in the social-economic aspects of animal husbandry, and those in turn have imposed new functions upon the veterinary profession, which also require that consideration must be given to the more or less urgent need of reorientation of our curricula.

Curricula have, indeed, engaged the attention of those interested in veterinary progress for some time, but this attention has largely centered about length of courses, time devoted to subjects and questions of uniformity. No doubt, those considerations are largely justified by actual conditions, but on the whole they have been permitted to overshadow the far more important features pertaining to teaching technique and methods, which after all constitute the very essence of professional training.

That those features are uppermost in the minds of certain progressive teachers is encouraging enough, but it should receive more than a mere private interest.

The attempt to standardize our curricula, to create a more or less iron-bound uniformity of courses, may be praiseworthy enough, but when carried beyond a certain point it is apt to

become obstructive to progress. It may be well to define for certain subjects the proper place in the curriculum or to determine how many hours should be devoted to them, but the autonomous conduct of an institution, as long as it admits only students with sufficient preparation, should not be subjected too much to the ministrations of overlords whose educational ideals, perhaps, as yet permit no distinction between schools conducted in the interests of their promoters and those forming an integral part of public higher education.

As long as we have no uniformity in human ideals, in intellectual achievements and above all in the capacity of a teaching personnel, we can have no illusions about a rigid uniformity of schools. However much this may be desired by some, schools will continue to excel in certain subjects and will fail to achieve the best in others.

Those natural and unavoidable limitations should by no means prevent us from establishing certain ideals and from striving for their realization, and with this in mind a given part of a curriculum may well become the subject of our serious consideration and inquiry.

No doubt the subject of communicable diseases now occupies a prominent place among those which will enable the future veterinarian to acquit himself in the fullest measure of the task which is essentially his. With the changes which this task has undergone as already mentioned, a consideration of this subject is a timely one and more in particular because of the abundance of evidence, that the importance of thorough training and instruction dealing with the transmissible diseases of animals is not always recognized.

When we witness the enormous sale of so-called immunizing agents of questionable value, how those often pertain to diseases of unknown etiology, how veterinarians are permitting themselves to degenerate into sale agents for biologicals and how our association meetings are rapidly becoming more market places for those products, where vaccine and serum hucksters all but monopolize the programs, we cannot escape the conclusion that a large number of veterinarians are not well fortified by a well grounded knowledge of the conception of infection, of the diseases produced in this manner or the immunity principles involved. Yet the very things mentioned are in reality but manifestations of the great interest taken

by veterinarians in general in this particular class of diseases. This interest, being apparently fairly established, leaves us with the problem, as to the best methods of rendering it fruitful and directing it in logical and rational channels.

The solution of this problem is to a large extent the function of our veterinary schools, which cannot remain blind to the fact that this constitutes one of their chief claims to public confidence and support. For this reason alone a discussion of the ways and means by which this may be best accomplished appears to be warranted, especially so if this may lead to the establishment and the defining of certain ideals pertaining to this particular field of veterinary medicine.

Such a consideration must first of all include such details as the subjects placed in the curriculum and the preparation which the student should receive before he is asked to undertake its mastery. In dealing with such items as curriculum and students, we assume beforehand that the former extends ever a period of nine months for four consecutive years, and that the latter enjoys at least that degree of educational maturity, which we have a right to expect from the completion of a first class high school. We may further state, that in this discussion, we have in mind a curriculum based as much as possible on the logical sequence of the subjects taught, and in which the first two years are nearly exclusively devoted to the essentially non-clinical subjects, while the last two years are given to the purely clinical branches and those which are more closely connected with it.

The place which the subject of transmissible diseases should occupy in a curriculum is above all determined by the number and character of the subjects which may be deemed essential as preparation. While avoiding details, we deem it necessary to define the ones which more especially constitute the foundation upon which the presentation of the infectious diseases must be based. Without failing to recognize that nearly all subjects of a veterinary curriculum are related to one another, we mention here: bacteriology, veterinary zoölogy and entomology, general pathology, methods of diagnosis and immunology.

Although bacteriology belongs to the non-clinical subjects, it will not be possible to present it early in the course, where chemistry, anatomic subjects and physiology must be given the right of way. It can, however, be offered during the latter

part of the second year and extended into the early part of the third year. As presented to students of that status, we believe that emphasis should be given first of all to the classification of micro-organisms, their natural history, physiology, morphology and above all the technique and methods by which they are studied. We deem this much more imperative to good final results than a drilling at that time in the peculiarities of given species of pathogenic organisms, although in the part of bacteriology taught during the third year this could perhaps be undertaken. Whether or not the bacteriology taught should include a consideration of the protozoa is a question to be decided by the respective teachers of bacteriology and veterinary zoölogy.

The latter subject, dealing with animal parasites and insect parasites and insect pests, must also be regarded as basic to the teaching of the communicable diseases inasmuch as the latter include a large group which are caused by those factors, and, in the consideration of live stock sanitary methods, it is not always possible to make a distinction between diseases due to macro- and those due to micro-parasites. The teaching of veterinary zoölogy may also be undertaken during the end of the second and the beginning of the third year. While the relation of animal parasites to disease should be revealed to the students, it will not be necessary to give special emphasis to this feature, but classification, life history and morphology must be thoroughly treated, at least of the common and the more representative species.

General hygiene, also a subject fundamental to the later teaching of the transmissible diseases, may be taught at a time when the student has completed his work in physiology and chemistry. In presentation of this subject, the actual prevention of communicable diseases cannot be ignored altogether, but the major effort should be devoted to the relation of extraneous influences and surrounding media to animal well-being, while under the heading of hygiene may also be considered such features as statistics, sanitary laws, the exercise of the police power, etc. A student should be able to successfully grasp this subject during the latter part of the second year. During that time he may be permitted to visualize some of the problems connected with diseases, which will confront him in the third and fourth years. The subject of hygiene can be so presented that it constitutes a kind of connecting link between the strictly non-

clinical and the more purely clinical branches of the curriculum.

Of more importance, as such, however, is the instruction in general pathology and pathologic anatomy, which in the writer's opinion should be the *pièce de résistance* of the third year, even if at that time the student must be introduced to the surgical subjects and to special pathology and therapy. For the latter subjects general pathology and pathologic anatomy always is an indispensable ground work and it is so no less for the successful teaching of the communicable diseases. The teaching pathologist has the task of revealing to his students the operation of disease causes and its results on the body structures and functions. This instruction should not be confined to the static result of pathologic changes, but must also embrace the dynamics of disease if the student is to develop the power of reasoning and analysis upon which his future success is bound to depend. In no part of the curriculum is a thorough understanding between teachers more essential than between those in charge of general pathology, the surgical branches and special pathology and therapy. Their efforts must be carefully timed and in harmony, because of necessity their work somewhat overlaps, while one is dependent upon the successful teaching of the other.: This coordination is likewise of importance for the fruitful consideration of the communicable diseases.

Methods of diagnosis and clinical exploration must also be given a place in the curriculum of the third year and is as essential as a preparation and complement in clinical teaching as it is to the presentation of the transmissible diseases.

The latter should also be preceded by some ground work in immunology, which we conceive to be an inquiry into the various reactions set into motion when a foreign protoplasm or its derivatives invades the animal organism. The immunity mechanism should be thoroughly explained, the artificial methods based on it must be made clear to the student while the application of immunity reactions in the diagnosis and the investigation of disease requires a most thorough treatment.

From what was said above, it will be apparent that the subject of transmissible disease should form part of those taught during the fourth year of the curriculum, and that furthermore it should be given the status of separate discipline.

Such a status, however, should not prevent its perfect correlation to the other clinical branches, in fact it would not be

entirely incompatible to good results if the subject were handled by members of the clinical teaching staff. Nor, does it mean that the teachers of special pathology or surgery must keep aloof from any disease of bacterial or gross parasitic origin, but rather that a certain series of diseases must be set aside for a more special and detached consideration, either because of their general economic importance, their relation to public health, the special methods of their control or peculiar problems met with in their presentation to students.

Tentatively we may conclude in this series such diseases as tuberculosis, glanders, anthrax, black-leg, abortion disease, hog-cholera, the hemorrhagic septicemia group, coli bacillosis, necrobacillosis, foot and mouth disease, pleuropneumonia, rinder-pest, poultry scourges, rabies, coccidioses, piroplasmosis, trypanosomiases, mycoses, helminthiases, scabies, etc.

The selection of the series must be carefully made with the full participation of all teachers engaged in the instruction of clinical subjects in order to avoid unnecessary duplication. After the series has been so chosen, its systematic treatment becomes the function of the teacher or the department set aside for the purpose. This treatment must be thorough-going, and should embrace considerations relating to etiology, clinical features, pathologic anatomy, epidemiology, immunology and treat ment as well as prophylaxis.

In the presentation of the subject use must be made of didactic and laboratory methods as well as of clinical demonstrations and sufficient time must be made available for the purpose. Opinions will probably differ as to what constitutes a sufficient time allowance to be devoted to the teaching of this subject, but it is probable that with three one-hour recitation periods and three two-hour laboratory and clinic periods per week throughout the entire senior year justice could be done to the subject.

The teaching technique will vary with the ideas of the individual instructors and no advantage can be obtained by establishing hard and fast rules for their guidance, but even without attempting this it may be profitable to give this feature some general consideration.

The qualifications and the scientific and professional equipment of the teaching personnel will to a greater or less extent determine the manner in which the subject of transmissible disease is presented to an audience of students. In this subject

above all others a large experience obtained in the field, combined with scholarly attainments and a contagious enthusiasm for his work, would tend to make an ideal teacher. He would be able to present his subject without leaning on a text; he would largely furnish his own even if the task of the true teacher consists to a great extent in interpreting to his students the recorded work and observations of others. Such a teacher need not devote much time to hearing recitations by students in his lecture room, but only requires the casual discussions in laboratory and clinic in order to keep himself informed on his student's grasp and progress.

Unfortunately this type of veterinary teacher is rare in our country. Often there is a lack of scholarship in those who have a large and rich experience, while in the case of those who do combine those valuable qualifications, it is very uncommon that schools succeed in obtaining their services. For such men our schools have but a feeble attraction and even if an institution is capable of developing such a teacher, it is very apt to promote him into some executive position, in which his professional talents become lost in a tangle of administrative drudgery.

Thus necessity often forces institutions to employ as teachers young men, who however scholarly inclined, however enthuiastic for their work, are delinquent in that degree of practical experience which would qualify them as authority. When such men finally reach that stage of development the institutions usually lose them because for such men the current of attraction is commonly away from educational work.

Teachers of this type will frequently be dependent on an authoritive text and the method of class-room quizzing and recitations. No doubt this has its advantages also. Students so trained are perhaps better prepared to face a state examining board, which, as a rule, is more pleased with candidates whose heads are storehouses of facts than with those whose brains have acquired the rather uncommon but precious art of thinking and reasoning.

If teaching is to be worth while at all it must not only aim at the acquisition of more knowledge but at the development of the power of its logical interpretation as well. Facts can always be gotten from texts but in the formation of habits of thought

we will have to rely on the teaching staff unless the student is endowed by nature with an unusual mental equipment.

In the didactic presentation of the communicable diseases a general consideration of common features should precede the discussion of the special members of the group and the latter's placing in the teaching program should be more from the viewpoint of what may become available in clinic or laboratory than of their natural classification. In this relation two types of disease may be recognized, one including those diseases which are not likely to be met with in either clinic or autopsy room, and the other those with which the students can be brought in actual contact. In the planning of the teaching program the question confronts us whether or not the best results can be secured by a more or less systematic class-room presentation, using clinic and laboratory as secondary factors, or by building the course around the available clinical material. The latter could perhaps be accomplished with success in institutions which have at their disposal an enormous amount of material representing a great variety. As a rule our schools have no such a volume available and are compelled to get the best out of a more modest amount and hence they will be obliged to compensate for this deficiency by an emphasis on didactic teaching. The latter can and must be reinforced by laboratory work with and demonstrations of preserved material, and special pains must be taken to gather this in abundance.

Inasmuch as it is ordinarily impossible to time the presentation in clinic and autoposy room with that of the lecture room, we would be inclined to devote didactic teaching first to those diseases which are not apt to be met with clinically, and to use the available laboratory and clinic periods to a study of the preserved materials pertaining to them.

The living cases of the other type of diseases must even without a preceding class-room discussion be carefully studied in the clinic whenever there is opportunity. On such occasions the more salient features of the disease can be briefly explained, but the phenomena actually seen must be carefully recorded by the students by the direction and under the supervision of the teacher, and those records must again be consulted and discussed when the given disease is being considered in the classroom.

We deem this recording of facts actually seen in the clinic and autopsy room as of the greatest importance from an instructional viewpoint. Such records should be made on special forms as directed by the teacher; they must be made to form part of the students' permanent equipment as well as of that of the department. Not only should the student be obliged to preserve the records of the cases he has actually seen and studied, but those made by previous classes or other sections can also be drawn upon to complete the collection.

Such records in sufficient number will not only be of value in class-room discussions but will be much more important to the future practitioner than the time honored "notes" which he is often compelled to prepare with great effort and which in the end are far inferior to the printed text on his shelves.

The two-hour periods designated as clinic and laboratory should be devoted to clinical demonstrations, autopsies or laboratory exercises. In an ideal institution the department of transmissible diseases should have at its disposal the physical equipment, which would permit the teaching staff to either bring before a class living material for clinical study or to conduct autopsies or to take the students in the laboratory for bacteriologic, immunologic or histo-pathologic exercises. With the growing importance of this type of teaching we believe it justifiable to insist at this time that such equipment be provided. As long as our schools are not so equipped, it will be necessary to so correlate the time set aside for this type of teaching that laboratory facilities also used by other departments can be utilized.

This arrangement may have the appearance of a certain looseness or lack of system. It will furthermore impose some extra burdens upon the teaching staff, but is probably the only solution of the problem of getting the most out of time and material.

Clinical and autopsy material must be utilized to the greatest extent possible. A case of a given disease can both be presented by a teacher of surgery or special pathology as well as by the one dealing with transmissible diseases. The former will emphasize the more clinical features, while the latter will give special weight to its communicable character and its importance to exposed live stock. In the same manner will the pathologist share his material with the teacher of communicable diseases and vice versa. This may give rise to some duplication but to a useful one, and even if in some cases there may be conflict

in the expressed opinions of teachers, this can only result in stimulating the student to analysis, to reasoning and to independence of thought.

After all, like in other subjects, which have their place in a veterinary curriculum, the presentation of the communicable diseases must place the students in the possession of certain facts or theories, but at the same time they must be led to develop the habit of clear thinking and independent reasoning when confronted with a problem. A school which merely turns out living encyclopediæ only fulfills half of its mission. The other half, the training of mind, is what counts for fully as much.

In the light of the preceding discussion, the following conclusions are offered:

1. The present day functions of veterinarians render it advisable that the subject of communicable diseases be given a special place in the curriculum of veterinary schools.

2. That it is during the senior year, when this subject can be most successfully taught.

3. That the subjects bacteriology, veterinary parasitology and entomology, general hygiene, pathology and pathologic anatomy, methods of diagnosis and clinical exploration, general immunology constitute the immediate pre-requisites for the fruitful presentation of the transmissible diseases.

4. In the presentation of the subject, didactic teaching must be combined with laboratory exercises and clinical demonstrations.

5. Institutions are warranted to establish special departments devoted to this subject and such departments should have at their disposal the equipment necessary for the type of instruction mentioned in the preceding paragraph.

6. Not less than three lecture periods of one hour each and three laboratory and clinic periods per week throughout the entire senior year should be devoted to this subject.

PLACE AND RELATION TO OTHER SUBJECTS OF THE DISCIPLINE OF TRANSMISSIBLE DISEASES IN A VETERINARY CURRICULUM

SUBJECTS	1st YEAR		2nd YEAR		3rd YEAR		4th YEAR	
	1st Sem.	2nd Sem.	1st Sem.	2nd Sem.	1st Sem.	2nd Sem.	1st Sem.	2nd Sem.
Anatomic Group								
Embryology		▬						
Descriptive Anatomy	▬	▬						
Regional Anatomy			▬					
Histology and Mic. Anatomy	▬	▬						
Chemistry	▬	▬	▬					
Physiology			▬					
Animal Husbandry				▬				
Pharmocologic Group								
Materia Medica			▬	▬				
Pharmacy				▬				
Toxicology					▬			
Bacteriology				═				
Vet. Parasitology and Entomology			═	═				
General Hygiene				═				
Surgical Group								
Surgery					▬	▬		
Obstetrics					▬	▬		
Horse Shoeing						▬		
Pathology and Path. Anatomy					═	═		
Milk and Meat Hygiene						▬	▬	▬
Special Pathology and Therapy							▬	▬
Methods of Clinical Diagnosis					═			
General Therapy						▬		
Immunology							═	
Transmissible Diseases							XXXX	XXXX
Jurisprudence								▬
Ambulatory Clinic							▬	▬

LOUISIANA VETERINARY MEDICAL ASSOCIATION COMMITTEE MEETING.

On Saturday, July 26th, in the Association of Commerce, New Orleans, La., the Committee on Arrangements, the one on Program, Badges and Entertainments, and the sub-committee on Finance, appointed to cooperate with the A. V. M. A., held an interesting meeting and reported much progress along the lines of their respective duties.

The financial situation appeared to be well in hand and the outlook for further funds was bright. Dr. Cambon, Chairman sub-committee on Finance, reported that he had received donations from several Southern State Associations.

The question of badges was settled and those who attend the A. V. M. A. this fall may be proud to wear such an exquisite work of art. A special badge will be designed for the ladies, and will be one which will be useful long after the meeting is over.

The local program will be greatly enlarged and made extremely attractive so that each member will cherish it as a souvenir of the occasion. Considerable advertising will be secured for the program, which will make it unique in more ways than one.

All the Committees are giving important matters early attention so that every detail may be perfected before November 17th, and in the meantime, several other meetings will be held so as to take care of any new features which may arise.

Those in attendance were:

Dr. F. J. Cambon, New Orleans, La.

Dr. Frank Collins, Monroe, La.

Dr. F. J. Douglass, New Orleans, La., Chairman, Committee on Programs, Badges, and Entertainment.

Dr. E. P. Flower, Baton Rouge, La.

Dr. F. S. Hewitt, Hammond, La.

Mr. Thomas J. Hill, Association of Commerce, New Orleans, Louisiana.

Dr. D. H. Maclean, New Orleans, La.

Dr. Hamlet Moore, New Orleans, La., in Charge of Programs.

Dr. E. I. Smith, Baton Rouge, La., Chairman, Committee on Arrangements.

Dr. R. W. Tuck, New Orleans, La.

Dr. A. W. Vornheder, New Orleans, La.

The meeting was a splendid success, and each time we are always fortunate in having with us Mr. Thomas J. Hill, of New Orleans Association of Commerce, who gives us the benefit of his experience in handling other large conventions, particularly the entertainment feature and the hotel negotiations.

The conference emphasized the necessity of those contemplating attendance to make early hotel reservations. From present indications many are doing so and it is believved such a procedure will insure more comfort and satisfaction to all concerned.

The following letter has been sent by Chairman of the Committee on Arrangements to all the New Orleans hotels.

"On account of the meeting of the American Veterinary Medical Association, which will be held in New Orleans, November 17th to 21st, inclusive, all the New Orleans hotels have been given considerable amount of advertising through the pages of the Journal of the Association, which reaches nearly 4,500 subscribers, both at home and abroad. We expect about 1,500 or 2,000 of these members to attend the convention this fall, and have urged them to secure their hotel reservations months in advance of the meeting.

This will be a large and important convention and will mean much to New Orleans and the entire South. Therefore, it would be very gratifying indeed if you could give these requests very careful consideration by assuring those who write you that they will be taken care of immediately upon their arrival.

Mr. Thomas J. Hill of the Association of Commerce informs me that he believes the hotels will exert the limit of effort to accomodate all the delegates and their families who arrive. Distinguished speakers, such as Governor Ruffin G. Pleasant, Mayor Martin Behrman and Doctor Oscar Dowling, will be on the program of the convention, together with other notables from the veterinary profession in the United States and Canada.

Feeling sure of your heartiest cooperation, I beg to remain."

Acknowledgments have been received which are very gratifying, as they go on record with a promise to afford each member of the A. V. M. A. every attention and kind consideration. In arranging two other conventions in New Orleans for the B. A.

I. employes, the writer has found that the hotels lived up to their obligations. E. I. S., *Sec.-Treas.*,

Chairman, Committee on Arrangements.

WEST VIRGINIA VETERINARY MEDICAL ASSOCIATION.

The West Virginia Veterinary Medical Association met at the Hotel Kanawha, Charleston, W. Va., on July 1st, this being the annual meeting.

The following officers were elected for the ensuing year:

President, Geo. W. Kinsey, Wheeling.
Vice-President, I. H. Horton, Moorefield.
Secretary-Treasurer, S. E. Hershey, Charleston.

A very instructive paper was read by Dr. Neff, Federal representative co-operating in Tuberculosis Eradication.

The following members answered roll call:

W. E. Langford, Keyser.
I. H. Horton, Moorefield.
L. N. Life, Weston.
W. D. R. Nickoll, Lewisburg.
F. C. Nickoll, Cass.
J. A. McMasters, Ravenswood.
R. Morgan, Winfield.
E. M. Spangler and J. C. Callender, Parkersburg.
L. N. Reefer, Wheeling.
W. B. Alfred, Weston.
C. O. Davis, Richwood.
C. C. Hudkins, Charleston.
C. T. Higgenbotham, Charleston.

Drs. Neff and Armstrong, Charleston, W. Va., were elected honorary members.

S. E. Hershey, *Secretary.*

ILLINOIS STATE VETERINARY ASSOCIATION.

The summer meeting of this association was held in the Auditorium of the State University at Urbana on July 7 and 8. Over three hundred veterinarians were in attendance and a very interesting meeting was had.

Prof. Mumford, Dean of the Department of Animal Husbandry of the University, gave an address on "What the Livestock Breeder Expects of the Veterinarian." This subject was also discussed by D. O. Thompson of the State Agricultural Society. Dr. J. C. Stokes gave a summary of the results of a large number of autopsies at shipping centers and called attention to the large loss of livestock in shipping, much of which could be prevented. Approximately sixty per cent of the losses were the results of diseases of the respiratory organs. Dr. Stokes urged veterinary practitioners to advise their clients who shipped stock to avoid crowding, particularly in hot weather, to see that the cars were clean, disinfected and properly bedded and to avoid shipping weak, ailing animals or those advanced in pregnancy.

Dr. A. T. Kinsley spoke upon the "Differential Diagnosis of Some Transmissible Diseases of Swine." He deprecated the use of the term "Mixed Infection" diseases and stated that in his opinion this disease was hemorrhagic septicemia of swine. This subject provoked a lively discussion by Drs. Schwarze, Cahiel, Craig, Glover, Roberts and others.

Dr. H. B. Raffensperger of the Bureau of Animal Industry read an unusually interesting paper giving a summary of the recent discoveries with reference to the life history of the common round worm of swine. He also exhibited a number of unthrifty pigs. These pigs were sacrificed and the larval worms in the lungs were demonstrated to those present by miscroscopic examination.

Dr. W. W. Dimock of Lexington, Kentucky, read an interesting paper on "Animal Parasites," treating the subject broadly in its relation to Animal Industry and the general plan for their control.

Dr. H. Preston Hoskins of Detroit read a paper on "Hemorrhagic Septicemia" of cattle and called attention to the widespread distribution of the bipolar organisms. Dr. E. T. Baker of Moscow, Idaho, the recognized authority on sheep diseases, discussed this important subject in his entertaining way. Dr. W. G. Keehn read a paper on preventive medicine, dealing largely with the use of biologic preparations and sanitation. Dr. N. S. Mayo spoke on his veterinary experiences in the Tropics. Dr. E. L. Quitman discussed the "Treatment of Equine Influenza and its Complications" and State Veterinarian A. T. Peters spoke on "The Importance of Uniform Methods in Test-

ing for Inter-State Shipments.'' Lieut. F. Reynolds, V. C. U. S. A., and Dr. H. W. Burkland of Atlanta, Georgia, discussed the ''Biological Findings and Chemical Aspects and Treatment of a Fatal Disease of Horses and Mules at the Atlanta (Georgia) Stockyards.'' Dr. S. L. Stewart gave an illustrated address on ''Pecularities of Anatomy and Autopsies of Sheep.'' Dean Davenport of the Department of Agriculture of the University gave an address on ''The University's Part in Veterinary Education.'' The Faculty School of Music entertained the Association with a fine selection of vocal and instrumental music. Special provision was made for the entertainment of the ladies that included a visit to the Women's Department of the University and to the U. S. Aviation field at Rantoul.

N. S. M.

WESTERN NEW YORK VETERINARY MEDICAL ASSOCIATION.

The fifth annual meeting of the Western New York Veterinary Medical Association was held June 27th, Buffalo, N. Y.

The meeting was called to order at 10 a. m., and the forenoon was devoted to clinics which were held at the hospital of the Humane Society and consisted of operations of Neurectomy, Removal of Tumor, Treating of Capped Hock, etc. A number of cases were presented for diagnosis and observation.

The business session was opened at 3 p. m. with President J. L. Wilder presiding, 28 members responded to roll call, routine business was then disposed of, Reports of Officers was next given and showed the Association to be in good, flourishing condition.

Officers were elected for the ensuing year as follows:

Pres., Dr. W. E. Frink, Batavia, N. Y. V.-Pres., Dr. F. E. McClelland, Buffalo, N. Y. Sec.-Treas., Dr. F. F. Fehr, Buffalo, N. Y., and the following directors:

Rr. Anderson Crowforth, Lockport, N. Y. Director for 3 years.

Dr. Edward Rafter, Hamburg, N. Y. Director for 3 years.

Dr. E. L. Volgenau, Buffalo, N. Y. Director for 2 years.

Dr. Geo. R. Chase, Attica, N. Y. Director for 2 years.

Dr. Nelson P. Hinkley, Buffalo, N. Y. Director for 1 year.
Dr. Joseph L. Wilder, Akron, N. Y. Director for 1 year.

Four new members were added to our number making a total of 50 members.

At 6:30 the meeting adjourned for dinner, in which the ladies joined after spending the afternoon on a boat ride on Lake Erie.

After dinner the ladies were escorted to the theatre and the meeting reconvened for the addresses and papers.

Dr. Anderson Crowforth gave a very interesting talk on "How to collect the money". Dr. Crowforth showed the different ways and methods he used to extract the "coin" from the slow pay and dead beats.

Dr. Nelson P. Hinkley then gave a very interesting paper on Tetanus and Tetanus Antitoxin, showing how numerous tetanus cases had been treated with tetanus antitoxin successfully in all stages of the disease.

Dr. V. W. Rood read a paper on "Forage Poisoning" which aroused no small amount of discussion among the members.

Dr. F. F. Koenig gave a very interesting and instructive talk on "Physical Diagnosis of Cattle". The Doctor being well versed in this subject gave a very concise method for making a proper physical examination and showed where in many cases it was more accute or valuable than a biologic test.

Meeting then adjourned to the second week in December, 1919.

F. F. Fehr, *Secy.*

CONVENTION CALL.

NATIONAL ASSOCIATION OF BUREAU OF ANIMAL INDUSTRY VETERINARIANS.

Office of The Secretary,
185 Northwestern Ave., Milwaukee, Wisconsin.

August 12, 1919.

To the Officers and Members of all State, Divisional and District Associations, N. A. of B. of A. I. V.

Greetings:

This office has been directed by National President St. Clair, to announce that the Second Annual Convention of the N. A. of B. of A. I. V. will be held in New Orleans, La., beginning at 10:00 A. M., Monday, November 17, 1919.

The number of members for whom per capita tax has been paid for the fiscal year ending August 31, 1919, shall determine the number of votes to which a Division is entitled.

Enclosed herewith are credential cards for delegates and proxies. For each delegate elected, the President and Secretary of the Division should fill out a pink and white credential card. The white card should be mailed to this office and the pink card given to the delegate.

If the Division decides to be represented by a delegate of another Division, the blue and green cards should be filled in; the green card being sent to this office and the blue card mailed to the proxy for the Division.

The cards, after being properly signed, should be mailed to this office with as little delay as possible. This is important, not only for the purpose of facilitating preparations for the Second Annual Convention, but it is also very important to the delegates themselves.

If a Division is entitled to more than one delegate and sends only one delegate, such delegate is entitled to as many votes in the Convention as the Division or Divisions that he represents may be entitled to, and but one set of credentials need be made out for such delegate.

Each delegate should receive from the officers of his Division a pink credential card, and should deliver same in person to the National Secretary at Convention headquarters previous to the opening of the Convention; and for each proxy that may be carried, a blue credential card should be delivered to the proxy who shall file same with the National Secretary at Convention headquarters previous to the opening of the Convention. In this connection your attention is respectfully directed to the following extracts from our National Constitution adopted at the Philadelphia Convention:

Article IV, Section 1. The annual convention shall be held at the same time and at the place of the regular annual meetings of the American Veterinary Medical Association.

Article V, Section 1. The representation at the National Convention shall consist of duly elected delegates, who shall be entitled to cast one vote for every ten members, and one additional vote for a fraction thereof over five members in good standing of the State or District represented. Any State or

District, or any combination of States or Districts within a zone may send to the National Convention one or more delegates.

Article V, Section 2. The representation of any Association at the National Convention shall be based on the average amount of per capita tax paid by that Association during the fiscal year.

Article IX, Section 1. All National Officers not delegates shall be allowed the right to participate in all debates without the privilege of voting and shall not be permitted to cast a proxy vote.

Delegates should assure themselves as to the standing of their own Division and of any Divisions they are expected to represent by proxy. If you are not sure on this point, by sending a letter to this office you can procure the desired information.

Members who are in arrears cannot represent any Division in the Convention. Divisions should see that the credentials are properly filled in with ink, using the proper cards for the purpose, and mailing cards to this office as early as possible. It will be difficult to return the cards for correction and it is therefore urgent that the instructions be followed, thereby preventing delay and confusion to the delegates and to the Committee on Credentials.

No National Officer can cast a proxy vote, but he can cast the vote or votes of a Division if he be the regularly elected delegate of said Division.

The Grunewald Hotel, University Place, off Canal Street, will be our Convention headquarters. At this hotel we will have Convention Hall and executive offices free, and all officers and delegates desiring rooms at that hotel should make reservations at once as Secretary-Treasurer Rafnel of our Louisiana Division advises that it will be impossible to get accomodations at the Grunewald if you wait much longer. The rates on rooms at the Grunewald Hotel are as follows:

Single room without bath for one person, per day, \$1.50.
Single room without bath for two persons, per day, \$2.50 and up.
Single room with bath for one person, per day, \$3.00.
Single room with bath for two persons, per day, \$4.00 and up.
Double room without bath for one person, per day, \$2.00.
Double room without bath for two persons, per day, \$3.00 and up.
Double room with bath for one person, per day, \$4.00.
Double room with bath for two persons, per day, \$5.00 and up.

All correspondence regarding reservations of rooms at Convention headquarters should be addressed direct to the Manager of the Grunewald Hotel. The locations of other hotels in New Orleans and their rates were published in the Journal of the A. V. M. A., July, 1919, pages 465-466.

All Divisions are urged to be represented at this convention by regular delegates. Invitations will be extended to members of the Louisiana Delegation in Congress, the Honorable Secretary of Agriculture and other Department Officials, his Excellency, the Governor of Louisiana, the Mayor of New Orleans and other men prominent in public life, to attend this Convention. Many of our friends who are leaders in the U. S. Live Stock Sanitary Association will be present. Our Convention will be in conjunction with the 56th Annual Session of the American Veterinary Medical Association. It is therefore important that we have the largest possible number of delegates in attendance.

Division Secretaries should forward to this office, as early as possible, the names of regular and alternate delegates. All correspondence regarding credential cards, and other Convention matters should be addressed to this office.

We have arranged with the A. V. M. A. to have one session of the Section on Sanitary Science and Police at their New Orleans Convention devoted to papers and topics of special interest to B. A. I. veterinarians. It is believed that this arrangement will stimulate greater interest in the B. A. I. affairs with the profession in general and be of far reaching effect in our campaign of publicity.

On to New Orleans!

Fraternally yours,

S. J. Walkley, *Secretary.*

NEW YORK STATE VETERINARY MEDICAL SOCIETY.

The twenty-ninth annual meeting of the New York State Veterinary Medical Society was held at Brooklyn, N. Y., at the Imperial Restaurant, on July 23-24 and 25th. President G. A. Knapp presided. Mr. Fennelly of Borough Hall gave the address of welcome. Major D. H. Udall responded on behalf of the Society. The lady visitors were present during this part of the business session but left early to enjoy the many things

provided for them by the Local Committee on Arrangements. The Board of Censors presented the names of thirty-two candidates for membership. All of these applicants were elected without any dissension. This number of candidates marks the record for the Society up to this time. It is planned to make the list of applicants larger during the next year, and to make 1919-20 the banner year. The Board of Censors also presented the names of Dr. T. E. Munce of Harrisburg, Pa., and of Dr. Benj. A. Pierce of Springfield, Mass., for honorary membership. There was a unanimous vote for these two men, both of whom were present and participated in the discussion of papers.

In the afternoon session of the first day Dr. R. H. Spaulding read a paper on "Leukemia and Pseudo-Leukemia in Dogs". Dr. A. Eichhorn read a paper on the "Present Status of Hog Cholera". Dr. C. I. Corbin gave the last paper of this session. His subject was "Clean Milk." For the morning of the second day Dr. C. M. Carpenter discussed "Some Researches upon a Spirillum Associated with Abortion in Ewes". Dr. H. J. Washburn of the B. A. I., Washington, D. C., was to present a paper on "Diseases of Sheep". He was unable to be present and his paper did not reach the secretary until after the literary program was over. The paper will be published in the proceedings of the Society however. Dr. V. A. Moore read an excellent paper upon "The Law Relative to the Physical Examination of Cattle". Dr. Williams played his usual valuable part with "A Method for Measuring the Reproductive Efficiency of Cattle". In the afternoon Dr. J. F. DeVine gave a very interesting and instructive talk on "The Control of Abortion Disease and its Allied Ailments by the Practitioner." Dr. R. M. Kingston talked on "The Use of Garbage in the Feeding of Hogs." Dr. Kingston has had valuable experience in this field and it was reflected in his talk. Dr. S. A. Goldberg closed the literary part of the program with an illustrated talk on "The Differential Features Between Melanosis and Melanosarcoma." These papers will be published in the various veterinary journals of this country as well as in the proceedings and so no fuller discussion of the literary work will be attempted here.

A shore dinner was provided for the veterinarians at the Shelburne, Brighton Beach, on Thursday night. This was well attended and very greatly enjoyed. The dinner was followed by a night at Coney Island. Most of the party were much in-

terested in this resort. Some of them at least made three separate visits. We had an excellent scientific and practical program from which all obtained great benefit. Coney Island was a healthy stop-gap between more serious efforts.

The third day of the meeting was set apart for the clinic. This was held at the hospital of Gannett & Risley, 74 Adams St., Brooklyn. The clinic was interesting and helpful. So many cases were found on hand that a lunch was served at noon at the hospital in order to finish the work in the afternoon. Dr. S. A. Goldberg was scheduled to give a post mortem demonstration at the clinic but it was found necessary to have this work done the day before.

A large number of the members and visitors stayed for Saturday in order to make the trip to the Lederle Antitoxin Laboratories at Pearl River, N. Y. Those who did were greatly repaid. We not only saw this well equipped and sanitary institution, but were allowed to see the steps in the preparation of the different serums and antitoxins. It is very unusual to add a fourth day to the time of the meeting but Dr. Eichhorn and his staff made this one of the best days of the meeting for those of us who were privileged to stay for it. The whole day was provided for by the Laboratories. This included a most excellent lunch served to us by the members of the staff who were supervised in this part of the entertainment by Mrs. Eichhorn.

Dr. H. S. Beebe of Albion, N. Y., was elected President, Dr. Wright J. Smith, Kingston, N. Y., Vice-President; Dr. C. E. Hayden, Ithaca, N. Y., Secretary-Treasurer; and Dr. H. J. Milks, Ithaca, N. Y., Librarian.

Dr. V. A. Moore invited the Society to Ithaca for the next annual meeting. The invitation was accepted. Ithaca will be a good place to look forward to for next year. Dr. Cassius Way and the other members of his committee set the standard a little higher than usual at Brooklyn. Ithaca will at least keep up to that standard at the next annual meeting.

C. E. HAYDEN.

Dr. H. W. Wilson has recently received his honorable discharge from the army and is now located at Helena, Ark.

Capt. Jos. F. Crosby has been transferred from Camp Grant, Ill., to Camp Knox, West Point, Ky.

COMMUNICATIONS

FETISH WORSHIP.

Editor, Journal:

Is not the time ripe for a return to sane methods in the matter of admission to the Veterinary Schools? Probably every Dean in the land finds himself yearly face to face with the necessity of refusing admission to young men of high character, possessed of a fair elementary education, familiar with farm life, and farm animals and, best of all, endowed with the belief that Veterinary Medicine is the life work they most ardently desire. We believe that insistence on high school semesters or Regents' counts is based upon a common error, *i. e.,* that the acquisition of high school diplomas or Regents' counts constitutes a liberal education.

The advocates of this system lay stress on the impossibility of getting a veterinary education if these preliminaries are lacking.

A little quiet thought will show how untenable their position is. We throw down this challenge. "There is no subject in the curriculum of any Veterinary School on this continent that cannot be mastered by a student who has passed the Grammar Grades of a modern public school and has also had *two years* High School facilities in Algebra and Plain Geometry".

LANGUAGES ARE USEFUL, NOT ESSENTIAL.

No one appreciates more fully than the writer the advantages of a good general education. It smooths one's way, renders life worth living, allows its possessor to withdraw himself from the petty cares of the world and rest in the contemplation of literature or art.

Other things being equal, the highly educated veterinarian has a better social position.

The present methods deprive us of a class that are in every way desirable, *i. e.,* the country bred man who has reached perhaps his middle twenties, and is irresistibly drawn to Veterinary Medicine.

He has learned to stand alone, knows the value of time, money and application, *and once in the profession, he makes*

good. Why injure at once the stockowner, the schools and the profession by the perpetuation of this academic nonsense?

Say to the student: "You will find this school easy to get into, hard to get out of."

Let him take the chances—he will rarely fail himself or you.

No doubt many teachers of Veterinary Medicine feel like I do about this matter.

Let us get together and insist on the modification of this un-American method of cultivating the spirit of class.

Very truly yours,

THOS. B. ROGERS, *D. V. S.*

OKLAHOMA NOTES.

One of our dispensers of anti-hog cholera serum has recently been convicted in the district court for causing the death of about 200 pigs. The plaintiff claimed that the party doing the vaccinating guaranteed good results. The jury assessed the damages at $3,000.00.

The case will be appealed, since it is claimed that the pigs died from causes over which the operator had no control.

Dr. E. V. Robnett, State Veterinarian, has recently tested 55 head of Holstein heifers which were in the hands of a dealer in the southwest part of the state. Twenty-three reactors were found.

These cattle were part of four carloads recently received from New York and it appears that some of these cattle have been trailed into Texas.

State authorities report a great many herds of sheep as being infested with stomach worms. The copper sulphate treatment is giving good results.

Dr. H. H. Kettler, of the B. A. I. force, has been transferred to Hog Cholera Control Work at Fort Worth, Texas, effective August 11th.

Dr. Ivan W. Allen, who has been with the Army Veterinary Corps for about two years, has been reinstated on the meat inspection force, effective August 1.

Dr. H. W. Ayres has been appointed as Deputy State Veterinarian. He gives most of his time to tuberculosis eradication.

J. S. GROVE, *Resident State Secretary.*

NECROLOGICAL.

DR. CHARLES M. COOPER.

Dr. Charles M. Cooper died at Kansas City, July 2, 1919. Born in Trenton, Butler County, Ohio, October 26, 1876, and entered the service of the Bureau of Animal Industry as a tagger in December, 1902. He was previously engaged as a teacher in public schools. He was graduated from Kansas City Veterinary College in 1906, and was appointed a veterinary inspector in the Bureau of Animal Industry through civil-service examination. He was assigned to duty as an abattoir inspector and rendered efficient service.

DR. CHARLES F. COLSON.

Dr. Charles F. Colson, veterinarian in the Bureau of Animal Industry stationed at Union Stock Yards, Chicago, Ill., died July 2, 1919. Born at Lake Geneva, Wisconsin, April 29, 1879. Graduated from the McKillip Veterinary College in 1905, and took a special course for six months in pathology and diagnosis at that College following graduation. Appointed veterinarian in the Bureau through civil-service examination June 12, 1905, and assigned to duty at Seattle, Washington. He was transferred to Chicago, Ill., in 1906, and has been employed there most of the time since that date.

The Eastern Iowa Veterinary Association will hold its next regular meeting in Muscatine, Iowa, on October 8-9th. Elaborate arrangements have been made by the committee in charge for a program and entertainment, and a large and successful entertainment is anticipated. All neighboring veterinarians are invited to attend. The program will be especially interesting because it will deal with some of the newer conditions which have arisen in Iowa during the past year.

Dr. Charles Thigpen is now at Anniston, Ala.

REVIEWS.

THE EXAMINATION OF THE URINE OF THE HORSE AND MAN.

By PIERRE A. FISH, D. Sc., D. V. M., Professor of Veterinary Physiology, New York State Veterinary College, Cornell University.

Third Edition revised. 79 pages. The Comstock Publishing Company, Ithaca, N. Y., 1919. Cloth, price $1.75.

It is unnecessary to allude to the importance placed by the practitioner of human medicine on an examination of the urine as an aid to diagnosis and prognosis in the human patient; and while this has not been taken advantage of to the same extent by the Veterinarian, there is no valid reason why this should be the case at the present time with the advanced state to which the education of the veterinarian has attained.

The author early realized that simplification of methods, without too great a sacrifice in accuracy, is essential for satisfactory examination, especially by veterinarians, and has, in subsequent editions, faithfully endeavored to eliminate apparent difficulties, until in this latest edition, by making certain changes and some aditions, he has been able to bring the work up to date.

Dr. Fish is to be congratulated for presenting to the Veterinary Profession this valuable work on a subject of such great importance, which is bound to be taken more advantage of, as time goes on, as a valuable aid to diagnosis in veterinary patients.

The work contains some ten chapters, with illustrations. Chapter I is devoted to the Secretion of Urine; Chapter II., to Quantity, Color, etc.; Chapter III, to Qualitative Tests; Chapter IV, to Organic Constituents; Chapter V, to Abnormal Substances in the Urine; Chapter VI, to Bile, Blood, etc.; Chapter VII, to Quantitative Analysis; Chapter VIII, to Volumetric Methods; Chapter IX, to Chemical Examination of Urinary Deposits, etc.; Chapter X, to Microscopical Examination of Urine, etc., and an Appendix with Formulæ for Reagents.

The name of Dr. Pierre A. Fish attached to any work bearing upon the subject of veterinary physiology is sufficient to warrant the authenticity and accuracy of the subject matter; and we feel that this latest edition of his work on the Urine

should occupy a prominent place in the library of every progressive veterinarian.

The publishers have every reason to feel satisfied with the appearance of the publication. W. H. D.

BOOK OF VETERINARY DOSES, THERAPEUTIC TERMS AND PRESCRIPTION WRITING.

By Pierre A. Fish, D. Sc., D. V. M., Professor of Veterinary Physiology, New York State Veterinary College, Cornell University.

Fifth Edition revised. 185 pages. The Comstock Publishing Company, Ithaca, N. Y., 1919. Leather, price $1.50.

The value and popularity of a work is generally evidenced by the number of editions through which it passes. This being the case, it is obvious that previous editions of Dr. Fish's excellent little work have fully met that requirement, and that the Fifth Edition will be as eagerly sought after as those which have preceded it.

This little pocket edition is a veritable *multum in parvo* concerning the topics to which it is devoted, as may be inferred from the following divisions: Dosage or Posology; Veterinary Doses; Therapeutic Terms; Termination of Medical Terms; Prescription Writing; Weights and Measures; The Principles of Combining Drugs in a Prescription; Examples of Prescriptions; Thermometric Equivalents; Deliquescent and Efflorescent Salts; Latin Words and Phrases with Abbreviations and English Equivalents; Incompatibility; Examples of Incompatibility in Prescriptions; Poisons and their Antidotes; Classification of Medicines according to their Physiologic Actions; Physiological Points for Practioners, Etc.

The author's reputation as a physiologist and therapeutist, and the success to which previous editions of this work have attained, is so well known to the Veterinary Profession, both at home and abroad, that the success of his latest effort is already assured.

The publishers are to be commended for the excellent manner in which they have performed their part.

W. H. D.

After having served with the veterinary corps of the army, Dr. R. F. Vermilya has been discharged and is now with the B. A. I., at St. Paul, Minn.

MISCELLANEOUS.

AGRICULTURAL APPROPRIATION BILL PASSED.

On the evening of July 24, the President signed the bill making appropriations for the Department of Agriculture for the fiscal year ending June 30, 1920. It is very gratifying to those who are interested in live stock matters that the Congress in its wisdom has seen fit to increase the appropriation for conducting some of the important activities of the Bureau of Animal Industry.

In the item for inspection and quarantine work, including the eradication of scabies in sheep and cattle, there is an increase of $21,338. This increase was allowed for the purpose of combating sheep and cattle scabies, which during the past year has reappeared in some localities in the Western States.

An increase of $1,000,000 over the amount of last year is allowed for the control and eradication of tuberculosis of animals, which gives the Bureau $1,500,000 for this work. However, in providing this increase, Congress has stipulated that the amount provided, the sum of $500,000 is to be used for administrative and operating expenses, while $1,000,000 is to be used for the payment of indemnities for cattle destroyed. It was evidently the desire of Congress that the owners of cattle destroyed on account of being affected with tuberculosis should receive the greater portion of the appropriation in the way of indemnities, and that the benefits to be derived by the public at large through the eradication of the disease should be taken care of by the use of one-third of the appropriation. It is considered that the owners of the cattle destroyed suffer the greatest loss, and, therefore, they should receive the direct benefits of the appropriation through the use of the greater portion of the funds for indemnities.

In the item for animal husbandry work there is an increase of $19,000 over last year's appropriation. This additional sum is to be used for the investigation of the soft pork problem, which is becoming more and more important with the rapid development of the swine industry in the Southern States.

The item of hog cholera control work provides the sum of $446,865. This appropriation is nearly equal to the combined

sums of the regular appropriation ($247,600) and the allotment from the War Emergency appropriation ($202,000) that was used during the last fiscal year in combating hog cholera. The available funds for this year's work will enable the Bureau to continue these activities on about as extensive a scale as during the last year of the war.

In addition to the regular annual appropriation of $3,000,000 for carrying out the provisions of the Federal Meat Inspection law, there has been appropriated an additional sum of $803,960 for the present fiscal year, which is $426,760 over last year's appropriation. Of this increased amount Congress has stipulated that $100,000 may be used for the inspection of horse meat. The balance of this increased appropriation will be used for advancing the salaries of the Meat Inspection employees. An important provision has been included in the law authorizing the Secretary of Agriculture to pay employees of the Bureau detailed to meat inspection establishments for all over-time work performed at such establishments, at such rates as may be determined by the Secretary, and to accept from the establishments reimbursements for the sums paid out by him for such over-time work. J. R. M.

A PRECURSOR OF MENDEL.

Besides the work of the two Englishmen, Knight and Herbert, an experiment from the first half of the nineteenth century, which has elicited considerable interest, because of its suggestion of the later discoveries of Mendel, is that of John Goss, of Hatherleigh, Devonshire, England, with garden peas. In the summer of 1820, Goss pollinated flowers of the Blue Prussian variety with pollen of a dwarf pea known as Dwarf Spanish, obtaining as the result of the cross, three pods of hybrid seeds. In the spring of 1821, when he opened these pods for planting, he was surprised to find that the color of the seeds (*i. e.,* of the cotyledons), instead of being a deep blue like those of the female parent, was yellowish-white like that of the male. Here was evidently a case of complete dominance of yellow-white over blue cotyledons. However, the plant growing from these seeds in that season "produced some pods with all blue, some with all white, and many with both blue and white peas in the same pod." Here was evi-

dently a plain discovery of the fact of segregation, according to what later became known as Mendel's law.

The following spring (1822) he separated the blue peas from the white, sowing the seeds of each color in separate rows. He found that the blue seeds, which we should now call the "recessives," produced in turn only blue seeds; while the white seeds, or "dominants", as they are now called, "yielded some pods with all white, and some with both blue and white peas intermixed." Here, then, is the typical case of the segregation of the heterozygotes or hybrid dominants.

Although Goss in this experiment undoubtedly made evident the fact of dominance and segregation, he did not recognize them as such, nor did he, apparently, sow the seeds of his different plants separately, or make counts of the number of seeds of the two colors found on each separate plant, as did Mendel in his experiments.

Goss was chiefly interested in the question of the possibility of the "new variety" having superior value as an edible pea, and yet remarked that, in case it possessed no superior merit, there yet might be "something in its history that will emit a ray of physiological light." However, the "physiological light" did not appear until after the discovery of Mendel's papers in 1900.—*Herbert F. Roberts in Journal of Heredity.*

Captain Lester R. Smith of the Veterinary Corps, United States Army, has just returned from duty over-seas. He entered the military service as second lieutenant and was not long in being promoted to the grade of Captain. Before joining the A. E. F. he was an employee of the B. A. I., and is now coming back to the service and reports for duty at Fort Worth, Texas, where his address will be 602 Flatiron Building. He predicts that the New Orleans meeting will be the largest ever held and the boys who wore khaki will be well represented. Dr. Smith spent about two weeks with his brother, Dr. R. L. Smith, in Natchitoches, La., where he and his charming wife made his visit one continuous round of pleasure, and making him doubly glad that he could be back to the good old U. S. A. The Captain rather hesitated about leaving Louisiana, particularly Natchitoches, because of the sincere hospitality of its splendid people, who are famous for allowing their guests to invariably leave with one regret, notably because they cannot linger a little longer; however, they make up for this and quickly hurry back.

TICK ERADICATION IN THE SOUTH.

Status of Cattle dipping for the month of July, 1919, in the following states:

	Number of dippings.
Alabama	1,045,425
Arkansas	686,799
Florida	227,260
Georgia	519,444
Louisiana	1,405,535
Mississippi	370,284
North Carolina	6,963
Oklahoma	574,649
South Carolina	158,208
Texas (North)	1,691,157
Texas (South)	512,558

LOUISIANA STATION BULLETIN ON ANTHRAX.

Louisiana Experiment Station Bulletin No. 168 on The Transmission of Anthrax by Non-Biting Flies by Dr. Harry Morris, Bacteriologist and Assistant Veterinarian, has just been published, and contains some very interesting and important information on the subject which should prove valuable to the veterinary sanitarian.

Dr. F. M. Kearns has purchased the practice and hospital equipment of Dr. E. M. Lang at Louisville, Ky. Dr. Lang has returned from practice and has bought a large stock farm near Louisville.

Dr. J. R. Houchins has received his discharge from the army at Camp Bragg, N. C., and is now located at De Funiak Springs, Fla.

Dr. Michael Shipley is now at Little Rock, Ark. His former address was Cookeville, Tenn.

Lt. Max Siereveld has been transferred from Texas to Camp Eustis, Va.

NATION-WIDE DRIVE TO IMPROVE ALL LIVE STOCK.

United States Department of Agriculture Announces Campaign to Eliminate Scrub Sires from Breeding.

"Better Sires—Better Stock."

This is the slogan of a national better live-stock crusade, to get actively in motion October 1, that is announced by the United States Department of Agriculture, working in cooperation with the State agricultural colleges and other agencies interested in live-stock improvement. The campaign looks forward to the future food needs of this country's increasing population and results from long and careful observation of the live-stock industry in this country, and was planned after extensive consultation with specialists and breeders. The plan is to hasten the replacement of the multitude of scrub domestic animals in the United States with pure-bred or high-grade stock, and also to improve the quality of pure-breds themselves. The goal in view is greater efficiency in production.

The campaign will be the first organized crusade in a large country to improve all live stock simultaneously. It will interfere in no way with any work in live-stock improvement now being conducted, but makes all the work more definite and effective by providing official recognition for progressive breeders.

The campaign will be supervised from the Department of Agriculture in Washington, and in each State by the State agricultural college. County agents and other field workers of the Department of Agriculture and of the State colleges will handle the campaign locally. Every live-stock owner actively cooperating and keeping and using none but pure-bred sires of good quality will be given an emblem as an official recognition of meritorious effort.

Dr. W. A. Curtis has been transferred from Chanute, Kans., to Kansas City, Mo.

Dr. J. M. Twitchell has returned from France, where he served with the A. E. F. at a Veterinary hospital for over a year, and is again located at Center, Colo.

I WONDER.

I wonder if the new regulations of the U. S. government for the testing of milch cattle in transport from one state to another, with the rigid provisions therefor which went into effect July 1, do not owe at least their inception to the fight Dr. Winchester of this city is putting up against crooked methods in admitting and testing diseased cows. The local doctor may be more than a voice crying in the wilderness, after all, as slowly but surely the public is being awakened to the menace the tubercular cow is to the public health.

—*The Leader, Lawrence, Mass.*

As the Journal goes to press we are in receipt of a neat little booklet "Recuerdo de Buenos Aires", from Dr. H. L. Darby, who is still in the tropics as a specialist for Sherwin-Wiliams Co. The photographs are splendid representations, depicting the magnificient beauty of Buenos Aires. It appears to be a city of unusual attractiveness and we guess the doctor will hesitate about leaving when he has completed his investigations.

The JOURNAL office is in receipt of numerous letters from members of the A. V. M. A., from all parts of the country stating that they will be on hand for the New Orleans meeting. Prospects are bright for a large attendance, and judging from the letters received the men who wore the khaki will be there in numbers, for even from far off France comes inquiries as to the time of the meeting, rates, etc.

Dr. E. P. Flower, Secretary and Executive Officer of the Louisiana State Live Stock Sanitary Board, is taking a much needed rest in the "Land of the sky," North Carolina.

Dr. M. H. Gandy, Shreveport, La., is temporarily in charge of offairs in the office of the Louisiana State Live Stock Sanitary Board.

Dr. E. B. Shaw, formerly engaged in tick eradication work in Louisiana, has been transferred to the work of hog cholera in the same state.

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